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Railway Age

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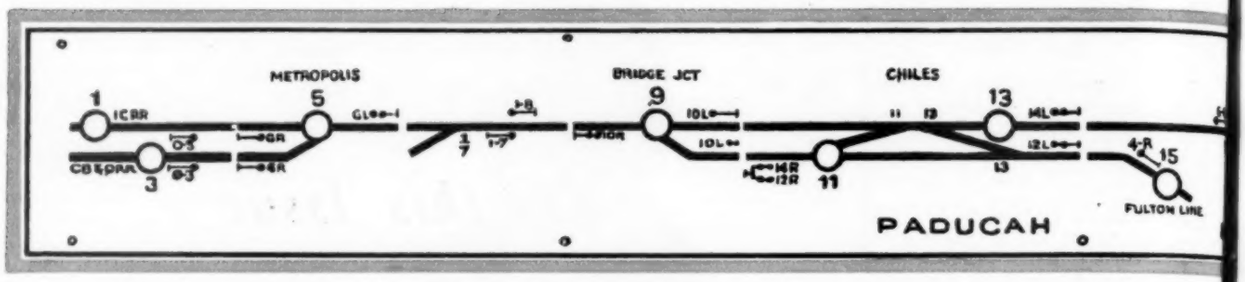
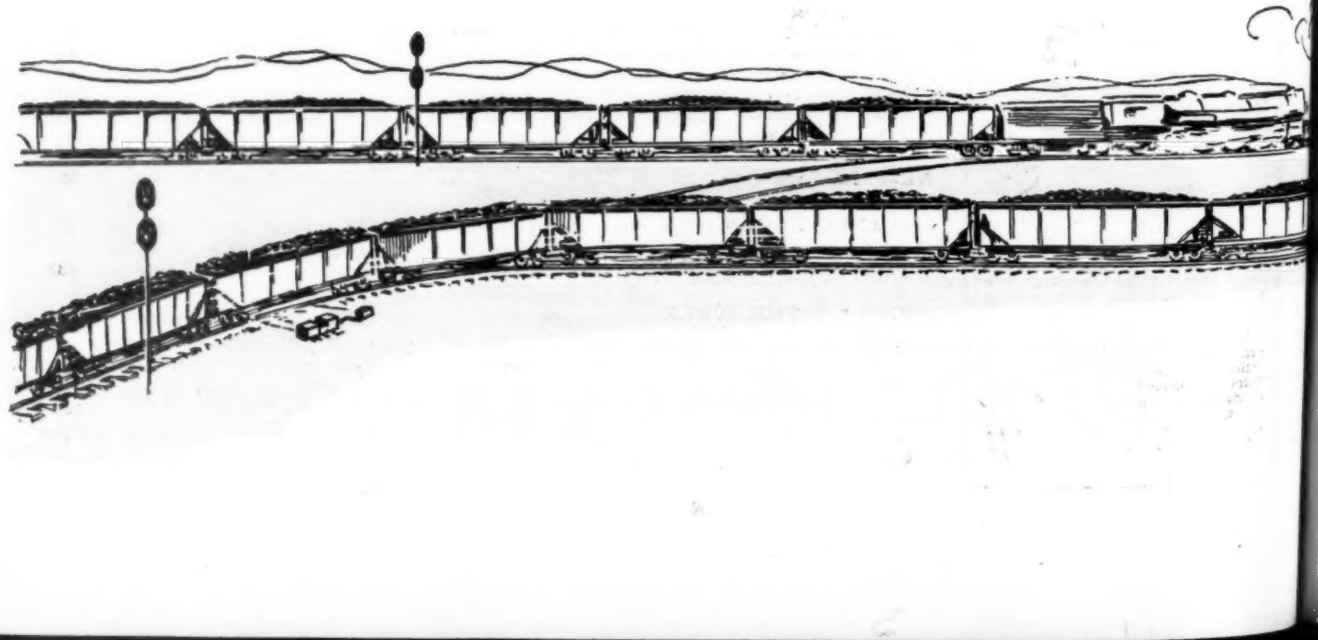
To Move



There are five junction points in the fifteen mile length of the Paducah and Illinois Railroad. Heavy coal trains from the Kentucky fields traverse this territory on their way to Chicago. Because of the number of junction points, their scattered nature, and the character of the freight handled, it is difficult to keep traffic moving. Trains approaching the junction over the Fulton Branch found starting difficult, if stopped at the home signal, because of the heavy grade at that point. There were delays of as much as two hours on this run.

Because of these factors the control of the entire territory is being centralized under one dispatcher, and four of the interlockings eliminated, by the use of the "Union" Dispatcher Control System. With this system the dispatcher is informed automatically of the location of each train and closer meets can be arranged.



Railway Age

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Delay in Paying Bills

IMMEDIATELY after the war it was well known that the railroads were slow in meeting their bills for materials and supplies. To their credit, it is equally well known that this condition was largely corrected as soon as the financial position of the railroads improved, until it is not at all uncommon at present for them to pay for supplies before the materials are received in order to secure the benefit of discounts offered. Yet, judging from reports prevalent, there is still some delinquency on the part of railroads in paying bills for supplies. It is particularly unfortunate that complaints of this kind seem to be directed, for the most part, against railroads that are financially so well prepared to meet their obligations promptly as to leave little doubt but that the delinquency is due to neglect or indifference rather than because of questions arising over deliveries, warranties or adjustments. This condition, moreover, is aggravated by the fact that it is the smaller business houses which suffer most from this neglect, apparently because they are not in a position to bring the necessary influence to secure prompt payment. This indifference has become so pronounced in cases as to discourage some concerns from seeking railway business, while some houses require payment on delivery. While the roads are paying so much attention to economical and efficient buying at present, they may also, with profit, investigate the efficiency with which they meet the obligations incurred in negotiating these purchases. Slovenliness in paying bills is to be shunned. It is too apt to be considered an evidence of bad faith, which no railroad cares to cultivate. It is a poor substitute for the confidence which it has been the aim of railroads in late years to inspire.

Employee Co-Operation

EMPLOYEE co-operation in the efforts of railroad officers to meet the new problems thrust upon them by the inroads of motor truck competition is strikingly illustrated by a recent act of Freeport, Ill., members of the Brotherhood of Railway Clerks. This action is reported in a communication published in the March issue of "The Railway Clerk," official organ of the brotherhood. The letter, which is signed by C. A. Casberg, vice-general-chairman, Illinois Central System Board, says: "Members of the Brotherhood, employed by the various railways entering Freeport, Ill., have taken a decided stand against the encroachment of motor trucks in the field of transportation. The attending results of the practice have been brought to the attention of the business and professional men of that city in the form of a resolution recently adopted. The resolution recites the tendency toward increased unemployment through the reduction in forces, and inasmuch as the monthly payroll of railroad employees in the city is close to $18,000, which is practically all spent in the city, an unfavorable result on business will naturally follow. Attention is also called to the investment in property of the railroads, the taxes paid by them, the quick, dependable service in any kind of weather, and the ability to pay claims in the event of damage as compared with the trucking companies. All possible publicity was given to the resolution through the local press, copies being furnished to the merchants and business men of the city and the Chamber of Commerce, urging them to give their freight and passenger business to the railroads. . . ." The foregoing is a typical example of the spirit of goodwill and co-operation which exists between railway companies and the labor organizations with which their employees are affiliated. Regardless of the particular issue and whether or not experience will reveal that the proper way to meet the motor truck competition is for the railways to engage in motor truck operations themselves, it is refreshing to note such instances of employee co-operation for the protection of revenues while the highway policies of railways are being determined.

A Report of Practical Value

IN the past there has been considerable adverse criticism of convention speeches and committee reports that contain general statements without specific data that may be used to solve the problems of the individual railroad man. It is, therefore, of special interest to note that C. F. Stoltz, chairman of the Signal Section, A. R. A., in his annual address before the convention in Chicago last week, presented specific data to show the extent to which installations of automatic signaling and interlocking completed during the last few years had contributed to increasing the efficiency of train operation as well as reducing the number of accidents. Following the address by Mr. Stoltz, the Committee on Economics of Signaling presented further specific statements on the costs of, and savings being affected by, modern installations of spring switches, automatic signaling, interlocking plants and centralized dispatcher systems for directing trains by signal indication. Division superintendents and signal engineers of seven different railroads then followed with papers explaining the benefits accruing from car retarders in service in classification yards. The address, the report and the papers, which were published in the *Daily Railway Age* for Tuesday, March 5, are of greater value because of the fact that the names of the roads, the location of each installation, and data on the costs and savings, are all given so that a reader can apply the information to his local problem, or, if necessary, write to the committee or the road involved for other information. This type of data and the method of presenting the report not only justify the statements in the

address of Mr. Stoltz, but also mark a forward step on the part of the Signal Section that may well be observed by other associations in the railway field.

A Hard Winter

THE mild weather that has prevailed throughout much of the country since the first of March has come as a welcome respite, after one of the severest winters for many years in the central and western sections. Expenditures for snow and ice fighting throughout northern Wisconsin, eastern Minnesota and adjoining states, were much heavier than they had been for a number of seasons, but of even greater consequence was the protracted period of low temperature. As a result the heaving of tracks was a source of trouble in latitudes ordinarily free from this difficulty. Another troublesome by-product of the winter that was particularly manifest in certain quarters, was the packing of flangeways at highway crossings, as the result of heavy automobile traffic. On lines subject to train movement at relatively frequent intervals, this is of little consequence, but at crossings of light traffic railways and heavy traffic highways the flangeways may become packed so solidly during an interval between trains as to create a serious menace to train operation. It places an added burden on the track forces employed on the secondary lines, which tends to increase even further the problem of adequate maintenance of the low-revenue producing portions of the railways.

"Whoopee" and Waterways

THERE has never been presented to the people of this country a project of large economic importance which so greatly needed thorough investigation and discussion as does the proposed extensive development of inland waterways. Although the nation seems on the verge of making vast expenditures to carry out the plan, it has had very little real investigation and discussion. Public sentiment in favor of it has been created principally by brass bands and shouting. Wild claims are made regarding the benefits the nation would derive from the development of water transportation but when these claims are challenged by those who believe they should be supported by evidence, they are often answered, not with evidence, but with threats.

The "Waterways Journal" is a paper published at St. Louis in the interest of inland waterways. In its issue for March 2 it published a report that Major C. L. Hall, the army engineer delegated to investigate the proposed nine-foot channel in the upper Mississippi river, had made a second adverse report regarding it. In the same column it concluded an editorial with the following paragraph: "Such men as the editors of the *Railway Age* and the Traffic World, and President Sargent of the North Western, and Bremner of the Minneapolis & St. Louis, in their constant disparagement of river transportation, are likely to create a boomerang of public sentiment that will hurt railway interests in general." Evidently even all the army engineers are not "sold" on all the waterway projects. Nevertheless, the paper quoted anticipates that the railways will be "hurt" if persons who are interested in their welfare, and who do not accept all the claims of the waterway enthusiasts, persist in "disparaging river transportation." Who will cause them to be "hurt" by arousing public sentiment against them? The water enthusiasts, if anybody. Similar threats have come from other sources. We have heard and read many intimations that manifestation by railway officers of opposition to waterway development will result in the railways suffering reprisals.

No great public question can be settled right if the discussion of it is to consist mainly of "whoopee" from those who favor a particular policy, and silence from those who do not favor it. All the *Railway Age* has done has been to challenge as unsupported and unsupportable by evidence the sweeping claims made in most of the waterway propaganda as to the "cheapening of transportation" and the benefits to the public, and especially to the farmers, that would result from extensive development of inland waterways; and this paper certainly will not be silenced by threats that are virtually an admission of the soundness of its position. We have heard and read many arguments for inland waterway development; but we have never heard or read one yet which dealt on their merits with the questions of economic principle and public policy involved. The country at present has adequate railroad transportation. The burden of proving that vast expenditures of public money for the development of different means of transportation will benefit the public rests upon those who make such claims. We decline to believe that in the long run it will "hurt" the railways to state sound principles of transportation economics and to demand that waterway advocates come forward with some evidence that the projects they advocate are in accordance with these principles.

What is "Co-Operation?"

At a luncheon in Chicago last week Major General Edgar Jadwin, chief of engineers of the United States Army, delivered an address emphasizing that it is desirable there should be co-ordination of different means of transportation and that there should be co-operation, and not competition, between railways and waterways, and contending that the development of waterways would be beneficial rather than harmful to the railways. No one will question the desirability of co-ordination of the various means of transportation by rail, water, highway and air. No one will question that co-operation between the managements of the various agencies of transportation is needed to bring about the co-ordination between them that is necessary to the public welfare. Probably the most desirable co-ordination of the different means of transportation can be brought about only when the same companies render service by rail, water, air or highway according to which agency can be employed with the best results in the particular circumstances. But a fundamental economic principle which should be accepted by regulating authorities and the managements of transportation agencies is that traffic should be handled by that agency which, in any given circumstances, can handle it the most economically in proportion to the quality of the service rendered.

If this principle is to be logically applied, however, there are certain important facts which must be recognized. One of these is that the cost of transportation includes all that is expended to make the rendering of it possible, including what is paid by the taxpayer, as well as what is paid by the traveler or shipper. Another is that when one means of transportation is required to pay all the costs of rendering its service from its earnings, and another means of transportation which competes with it for traffic has part of the cost of rendering its service paid from the public treasury, there necessarily results unfair competition.

General Jadwin says that the relationship between the railways and the waterways should be one of co-operation, and not of competition. But when two means of transportation seek the same traffic, there is plainly competition between them. When, therefore, waterway advocates come to the railways and say that those means of transportation should handle the traffic which it would be most beneficial to the public to have handle it, and that there should be co-operation and not competition between different means of transportation, the railways are justified in asking that they define the terms they use. What do they mean when they say that transportation by water is cheaper than by rail? Do they refer to transportation by ocean, or by the Great Lakes, or by improved rivers, or by canals, or by all of them? What do they mean by the cost of transportation—what the shipper pays, or what both the taxpayer and the shipper pay? What do they mean by "co-operation"—that different means of transportation should voluntarily co-ordinate their service, or that the railways should be forced by government authority to yield traffic that would be profitable to them to other means of transportation which they believe will incur greater total costs in handling it than the railways would incur?

Advantages Claimed for Waterways

General Jadwin said we are coming to realize "that the most efficient rail traffic depends on using to the limit the waterways. By reducing peak loads, by balancing rail hauls, by taking the burden of low-grade traffic, by preventing car shortages, by enhancing regional prosperity, waterways can be and are becoming an essential element in the railroad's fight for efficiency." What did he mean by "waterways"? If he meant deep waterways such as the ocean and the Great Lakes there will be little dissent from the proposition. If he meant improved rivers and canals, there will be widespread dissent by students of economics from his views regarding the advantages of water transportation. No railway expert will concede that transportation by rivers and canals has the advantages he mentions.

One fact to which General Jadwin did not allude is that the most important operation on the Mississippi river system is being conducted by the government with the money of the taxpayers, and that the railways are being forced to make through routes and rates in connection with the Inland Waterways Corporation which they regard as unsound economically and unfair to them. It will always be very difficult to convince the railways that this is a form of "co-operation" which can ever be advantageous to them or the public. Also, the railways are sure always to regard with skepticism the theory that increased movement of traffic by water will tend to increase the amount of traffic available for the railways. Transportation by water will tend to increase the prosperity of the country only if the total cost of rendering the service is less than it would be by rail. If, as a result of government subsidies, traffic that otherwise would be handled by rail is diverted to waterways on which it will be handled at a greater total cost than it would be by rail, the effect must be not only to deprive the railways of traffic which they ought to be allowed to handle, but also to impair the prosperity of the country and thereby reduce the total traffic that otherwise would be avilable.

The time has come when the public should demand less "whoopee", glittering generalities and threats of attacks upon the railways from waterway advocates, and more argument based upon sound principles of transportation economics.

Reduced Operating Expenses

THE latest annual report of the secretary of commerce declares that "the most conspicuous aspect of railway transportation during recent years has been the steady improvement in the quality of the service rendered," but the managements of the railways can be credited with another achievement during these years that is as remarkable as the improvement effected in service. Complete statistics regarding the results of operation in 1928, which only recently have become available, show that during the last five years the total annual operating expenses of the Class I railways were reduced almost one-half billion dollars. In 1923 they were $4,945,000,000, and in 1928 only $4,472,000,000, a reduction of $473,000,000. This explains why the net operating income earned last year was the largest excepting that of 1926, although total earnings were about $183,000,000 less than in 1923, and more than a quarter of a billion dollars less than in 1926.

The decline in total earnings has been due to reductions of rates and the decline of passenger traffic. It has been found impracticable to make any considerable reduction in passenger service to offset the loss of passenger business, and therefore the reduction in operating expenses is due almost entirely to economies that have been effected in the handling of freight, in spite of the improvement made in freight service. The principal reason for the more economical handling of freight is to be found in the increase effected in the amount of freight service rendered by each train hourly, and the consequent curtailment of the amount of freight train service required.

The average number of tons carried per train increased from 713 in 1923 to 793 in 1928, which was the best record ever made. Likewise, the average miles traveled by each freight train hourly increased from 10.9 miles to 12.9 miles, which also was the best record ever made. This combination of increased average train load and increased average speed of trains resulted in the average number of tons carried one mile hourly by each freight train increasing from 7,770 in 1923 to 10,205 in 1928, or more than 31 per cent. There was a large saving in the fuel bill, due to the fact that the average number of pounds consumed in moving 1,000 gross tons one mile was reduced from 161 in 1923 to 127 in 1928, or more than 21 per cent.

In the railroad industry, as in all other large scale industries, big investments of capital are pre-requisite to the effecting of large economies in operation. The total investment in the railways in 1928 was approximately $4,000,000,000 greater than in 1923. Although the railways effected during these five years a reduction in their total expenses of $473,000,000, they secured an increase in their net operating income of only $209,000,000, which was sufficient to pay a return of only about 5 per cent upon the new capital invested. The average return earned by them on their total property investment in 1923 was 4.48 per cent. and in 1928 4.71. This increase in the average net return shows that the railways benefited in considerable measure by the economies in operation effected; but the major part of the benefits of it were received by the public in reduced cost of transportation.

The Cost of Railroad Equipment

An account of the steps by which the price-per-pound basis of valuation was established

By H. E. Hale

Vice-Chairman, Presidents' Conference Committee

WHAT is the cost of a locomotive? What is the cost of a freight or passenger car? These are very simple questions, but before they were answered, the Equipment Committee, to which they were assigned, spent over $100,000 and eight years in studying them.

Strange as it may seem, we thought we would have to blaze a new trail and that old methods would not serve our purpose but the final solution proved to be a method already in use, with some modification and considerable refinement.

With the many possible solutions of the problem it is easy to see that strong differences of opinion would develop. At one time, when the committee seemed in hopeless disagreement, our chairman, J. Howland Gardner, arranged a trip on a Fall River Line boat to see Sir Thomas Lipton's yacht Shamrock IV race the Resolute. At another time he arranged a trip for the Committee up the Sound to Fall River, Newport and Providence. On these trips, what seemed to be unsurmountable differences of opinion were ironed out. The other fellow's viewpoint was given consideration and correct principles established.

Cost Per Pound of Tractive Force and Car Capacity

One of the new trails which we followed for some time in studying this problem was an effort to determine the cost of locomotives in cost per pound of tractive force, and cost of freight cars in cost per pound of capacity. This idea was suggested by a member of the committee, as it was said that engine tractive force and car capacity were the correct measures of their value. Perhaps these units were in one sense a measure of value but we soon found out that they were not good cost units. Furthermore we found that the value of railroad equipment depended on what it would cost to reproduce this equipment in the open market irrespective of what the engine would haul or the car would carry.

In addition to our Equipment Committee reaching this conclusion, this position had been very clearly stated by the Supreme Court when it said in the New River Collieries cases:

> If it be an article commonly traded in on a market and it is shown that at the time and place it was taken there was a market in which like articles in volume were openly bought and sold, the prices current in such a market will be regarded as its fair market value and likewise the measure of just compensation for its requisition. (262 U.S. 679.)

When we tried to use the tractive force of an engine as a cost unit we found a typical switch engine with its high tractive force and small total cost would cost 51 cents per pound of tractive force, whereas a passenger engine, under similar market conditions, with its low tractive force and high total cost, would cost 83 cents per pound of tractive force. This indicated that the pound of tractive force of an engine was not a good cost unit, even if it did appear in some ways to measure the value of an engine, and ended our studies in this direction.

Cost of Reproduction Determined by Trend

Another method considered and discarded was to determine the trend of cost of engines and cars and then adjust the original cost of the equipment to the date when cost to reproduce was desired, based on the trend of cost. This method was found defective because over a long period of time the design of equipment changed materially so that no reliable trend of cost of the identical unit could be determined for long periods and it was also found that railroad equipment remained in service twenty to thirty and sometimes forty years.

Furthermore, when this method is applied to two items of equipment of identically the same design which have been purchased in different years it invariably produces a different cost of reproduction for a given date for identically the same equipment, and this defect was not looked on with favor by our committee.

It is interesting to note that while the committee would not approve this method for determining the cost of reproduction of engines and cars, they did approve it for determining the cost of floating equipment. This was because they found a more accurate method for determining cost of engines and cars but it could not be applied to floating equipment.

Other Methods

Another method investigated for passenger cars was to determine the cost of each end of the car and then determine the cost of the intermediate portion as a cost per lineal foot. For several reasons this was found unsatisfactory, principally on account of the difficulty of determining such costs and then applying them to other equipment.

Another method was to deduct from the total cost and weight of the car, the cost and weight of specialties such as windows, seats, patent flooring, etc., and divide the remaining cost by the remaining weight (skeleton). This it was supposed would produce a uniform price per pound of the body or skeleton of the car but, on the contrary, it produced a very erratic price per pound which varied over 100 per cent for similar equipment. The reason for this was that the remaining cost included overhead and profit, which depend on market conditions.

Cost Per Pound

Thus by a system of elimination, after trying out all other suggested units or methods, the committee finally selected as the best cost unit the cost per pound of the light weight of the plain engine and car, to which should be added the excess cost of specialties. In so far as engines were concerned, and to some extent for freight cars, the cost per pound had been used for many years by motive power officers.

Some motive-power officers used the price per pound

of the engine and tender in working order, including a full load of coal and water. This unit was at least good for comparative purposes and had the advantage that the total cost and total weight in working order were readily available, whereas the light weight exclusive of coal, water, tools and crew was sometimes difficult to obtain.

In one case the committees found the price per pound was being obtained by dividing the total cost of engine and tender by the weight of the engine only in working order, including water. It was remarkable what good comparative figures had been obtained by this method by one prominent motive power officer.

Variables Affecting the Price per Pound

After the committee finally adopted as the best cost unit, the cost per pound of the light weight of both engines and cars, they were at once impressed with the great variation in the cost per pound due to what we termed variables.

The principal variables which affected the price per pound of engines were: (a) year purchased; (b) specialties; (c) market condition, and (d) weight of engine.

The time of purchase caused a great deal of variation in the price per pound, not only from year to year but from month to month for identically the same engine. This variation was due principally to change in price of raw material used in the manufacture of equipment. However, taking into consideration the problem at hand, namely, the determination of the cost to reproduce all

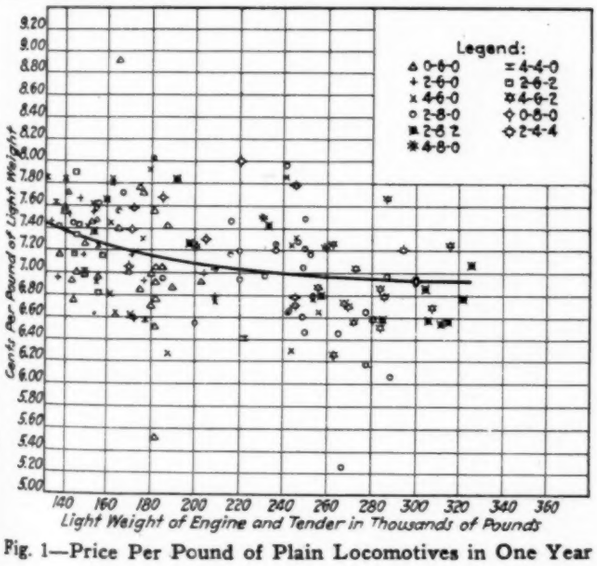


Fig. 1—Price Per Pound of Plain Locomotives in One Year

the engines and cars in the United States under the Valuation Act, we decided that the shortest period for which prices should be averaged was a year and our data were assembled accordingly.

A considerable variation in price per pound of locomotives was found to be caused by the so-called specialties, such as superheaters, stokers, pneumatic firedoor operator, etc. It was further found that the price per pound of specialties varied greatly and was, with few exceptions, in excess of the price per pound of the plain locomotive without specialties.

It was at once seen that if the problem was to be kept in simple form the list of specialties would have to be limited and therefore the first tentative report submitted to the committee listed only 87 specialties. However, in the final report the list had to be increased to 117. This small list was selected by ignoring all specialties of low excess cost or those which were only used occasionally.

For the all-steel freight car this question was very simple and the list of specialties was reduced to 50. For the composite wood and steel freight car and the all-wood freight car the specialty list as finally approved contained 322 items.

The passenger car presented a very difficult problem, and the first report listed 697 specialties. This list the committee insisted should be reduced, as it was felt by

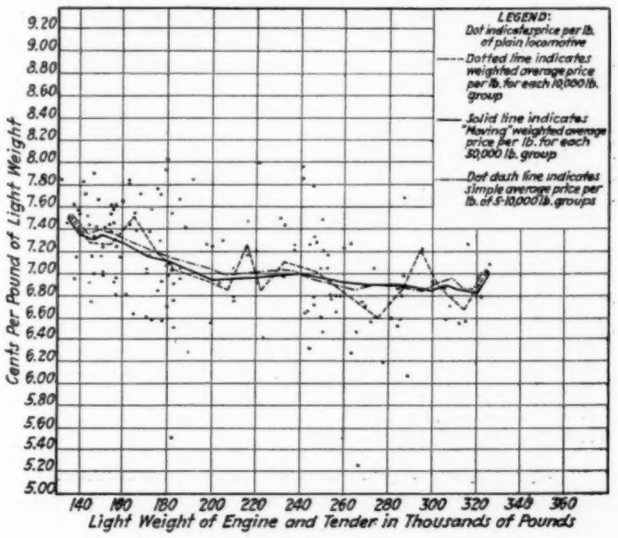

LEGEND:
Dot indicates price per lb. of plain locomotive
Dotted line indicates weighted average price per lb. for each 10,000 lb. group
Solid line indicates "Moving" weighted average price per lb. for each 50,000 lb. group
Dot dash line indicates simple average price per lb. of 5-10,000 lb. groups
Cents Per Pound of Light Weight
Light Weight of Engine and Tender in Thousands of Pounds

Fig. 2—Method of Determining a Trend Line Based on Locomotive Weight

some of the members that while a long list of specialties might appear to indicate great accuracy, such a list in fact might produce a less accurate total cost. With a view to keeping the report in simple form, the committee directed that the list should be reduced to 150, if possible. However, with the greatest reduction possible, with reasonable accuracy, there remained 432 specialties, which were finally approved.

The variable market condition was found to cause a very great fluctuation in price per pound, for when the shops were working part time the total price per engine was reduced in an effort of the manufacturers to hold their organizations together. Whereas, when demand was great, the price went up due to the law of supply and demand.

Possibly it is meaningless to attempt to adjust a price for the variable market condition, and the variation of price due to market condition, unadjusted, may be the most valuable information to obtain on this subject. An adjustment of price for market condition, however, has sometimes been made on the basis of the so-called purchasing power of the dollar. At all events the committee would not approve of any adjustment for market condition.

The cost data collected at once indicated that as the weight of engine decreased the cost per pound increased. This was first considered by the committee in the original shot-gun diagram, Fig. 1.

While this diagram plainly shows that as the weight of the engine decreases the price per pound increases, the next problem was to determine the average price per pound for engines of different weights. This was first determined by simply drawing a line approximately through the center of the dots with a flexible ruler.

However, this was soon found to be too inaccurate and a more reliable method had to be followed.

Fig. 1 also indicated that the price per pound was not materially affected by the type of engine, as the cost per pound of the passenger engine was found to be about the same as other types of the same total weight, such as switching and freight engines. This was contrary to the original opinion held by some members of the committee, including the writer. We had expected

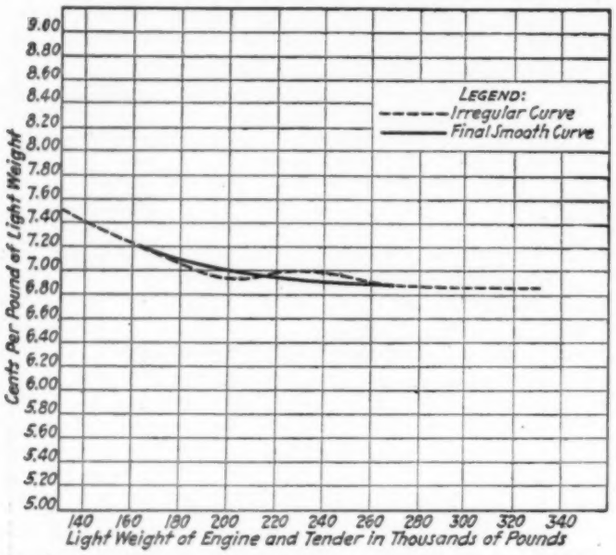


Fig. 3—Method of Determining the Final Smooth Curve, Based on Locomotive Weight

to find that the price per pound would vary with the type and would require a different diagram for each type, such as eight-wheel passenger, Pacific, Consolidation, Mikado, etc.

The only type where the price per pound actually varied from the average was the Mallet, which was found to be more expensive than the average engine of other types of the same total weight, due, of course, to the double set of working parts which required a greater portion of machine work.

Method of Determining an Accurate Trend Line

Several methods of determining an accurate trend line based on weight of engine were considered. The method selected is shown in Fig. 2 and was selected because of its simplicity as well as its accuracy. In Fig. 2 the dotted line is the weighted average for each 10,000-lb. group. The solid line is the moving average of a 50,000-lb. group, and as this line moves across the sheet, one 10,000-lb. group was dropped and another added. The dot-and-dash line is the simple average of five 10,000-lb. groups. These three lines indicated clearly that the location of the average line desired, which was of necessity a smooth curve, must pass through the approximate center of these three lines.

An irregular curve was then drawn through the center of the average lines and transferred to another diagram, Fig. 3, and the smooth curve shown as a solid line was drawn with equal areas above and below the irregular curve, weighted by the number of locomotives purchased in each area. This produced the final smooth curve showing the average cost of engines for various weights after minor irregularities, principally caused by market conditions, had been eliminated. Tests by individual members of the committee and others have indicated that this final curve was very accurate.

After finding that the price per pound of engines increases as the weight of the engine decreases, we supposed we would find that the price per pound of a car increased as the weight of the car decreased, but to our surprise we found this was not the case. After analyzing and studying the prices covering the sale of over 272,000 freight cars in the fairly stable market of 1910 to 1914, we found that there was no material change in the price per pound as the weight decreased and such minor changes as were found were evidently caused by some other element, such as market condition. This same condition was found to be true for passenger cars. After analyzing and studying the sales of 5,400 passenger cars in the fairly stable market of 1910 to 1914, the variations found in price per pound were certainly not due to change in weight of car.

During the development of these reports we found one motive-power officer who had endeavored to determine the cost of equipment by identically the same method for sales of equipment on his road. He gave up the study, however, because there were not enough purchases on one road to determine the laws which governed the prices. It is therefore clear that satisfactory results can only be obtained where a large number of data are available for analysis.

Five Year Curve 1910-1914 for Engines

The final curve for locomotives of various weights approved for issue to all concerned by the committee is given in Fig. 4, where one curve is shown for the years 1910 to 1914. In this diagram, the price per pound of

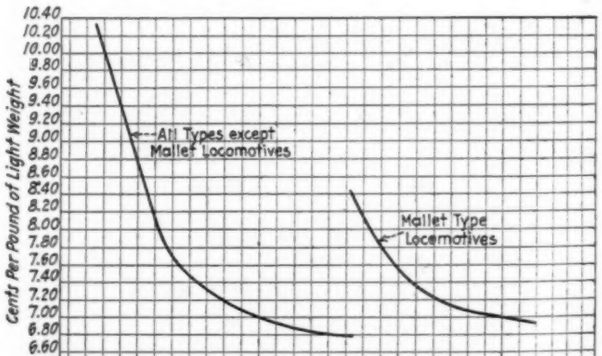


Fig. 4—Average Price per Pound of Plain Locomotives, 1910 to 1914

the Mallet type is shown separately from the other types, as this is the only type that had a different price per pound from the average of all other types.

On Fig. 1 are shown 140 sales for a total of 600 locomotives, which is clearly sufficient to fix very definitely the price per pound. However, Fig. 4 is based on the sale of 9,000 locomotives and illustrates the enormous amount of data studied and analyzed by the committee before they were willing to approve the report on the cost of locomotives.

Cost Per Pound of Plain Cars, Freight and Passenger

As it was found that the weight of a car did not affect the price per pound of the car, these data are best presented in tables, one for freight cars and one for passenger cars.

The price per pound given in all the locomotive diagrams is for what is termed the plain locomotive. By this the committee meant a complete locomotive equipped

with all parts necessary to run but not including the many specialties such as a superheater, feedwater heater or pneumatic fire-door operator, etc. These specialties are not used on all locomotives and are applied for the purpose of producing greater economies of operation.

There were two possible methods of determining the price per pound of the plain locomotive from actual sales:

(1) Deduct the weight and price of all specialties from the total weight and total cost of the locomotive, and divide the remaining price by the remaining weight.

(2) Deduct the excess cost of the specialties from the total cost of the locomotive and divide the remaining cost by the total weight of the locomotive.

The second method was adopted because it was simpler in operation and equally as accurate as the first method.

Price Per Pound of Freight Cars (Plain Car)

	All steel		All wood			Composite		
Year	Gond.	Tank	Box	Gond.	Refr.	Box	Gond.	Refr.
1910	2.536	....	2.091	2.149	2.271	2.324	2.294	....
1911	1.831	1.841	1.752	1.963	2.356	2.096	1.912	2.394
1912	2.061	2.306	1.940	1.999	2.281	2.225	2.148	2.454
1913	2.402	2.737	1.970	....	....	2.543	2.440	2.746
1914	2.094	2.386	1.892	1.970	1.994	2.019	1.987	2.352

Price Per Pound of Passenger Cars (Plain Car)

	All steel			Composite		
Year	Pass.	Comb.	Bagg.	Pass.	Comb.	Bagg.
1910	10.73	9.45	7.71	9.08	8.07	6.26
1911	9.02	7.77	6.90	8.67	7.40	6.15
1912	9.33	7.41	6.47	8.07	7.07	5.63
1913	9.32	8.70	7.42	8.17	7.84	6.00
1914	9.02	7.63	7.10	8.35	...	5.96

Excess Cost of Specialties

The excess cost of specialties was determined by deducting from the price of the specialty as sold, its weight times the average price per pound of the plain locomotive or car. In some cases, it was found difficult to obtain an accurate excess cost of the specialties, owing to fluctuations of market conditions and also to slight changes in design and weight of some specialties on different roads. This caused some concern at first until it was found that if an error was made by taking too high a price for the excess cost of a specialty, when this excess cost of this specialty was deducted from the actual cost of the engine as sold it made a corresponding decrease in the price per pound of the plain locomotive. While these errors were minor, it was a satisfaction to find that this method canceled out any error which might exist in the excess cost of the specialty and avoided any possibility of an accumulating error which is so dangerous in such a study.

Detailed Method of Determining Cost of Equipment

Full data showing the actual weighted average cost of railroad equipment each year from 1910 to 1927 is given in the committee reports, which have been sent to all railroads in the United States. These reports also contain full detailed instructions as to how the data should be used to determine the cost of reproduction new for any period covered by the reports.

With the many possible solutions of our problem, it is easy to see that our committee meetings brought out some lively discussions. At one meeting in Chicago a government official accused the committee of basing the price of old equipment on recent day specifications, which he claimed were better than older specifications and therefore our data would produce too high a price for reproducing old equipment. This statement was promptly challenged and Mr. Wilt asked to be permitted to answer it. He called attention to the fact that if we actually reproduced the old engines exactly on their old specifications, this would include items such as Russia jacket iron, walnut cabs, many old brass fittings, and in some cases hammered iron frames which would cost vastly more per pound than the material of modern specifications. This statement promptly ended further argument.

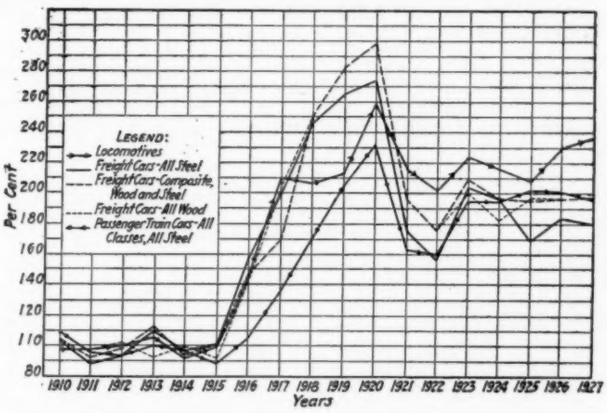


Fig. 5—Relation of Prices in Per Cent of 1910-1914 Averages for Locomotives and Cars

Cost of Equipment After 1914

After completion of the basic reports in 1921, which only covered the years 1910 to 1914, it was realized that the prices of that period were of little value in determining the cost of equipment for war years or for the period after the war. The committee, therefore, considered the revisions of all reports by the same method here described for a recent period, such as 1921 to 1925, but it was found that the cost of this work would be from $50,000 to $60,000.

To avoid this expense one of the manufacturers suggested that the Committee perfect a method of producing a trend line by determining the weighted average price per pound each year of engines and cars and adjust cost of equipment by this method for short periods. These trend lines are given in Fig. 5 and are based on the actual weighted average price per pound of 26,000 engines, 790,000 freight cars and 11,000 passenger train cars. The great volume of data on which these trend lines are based and the care with which the data are compiled and checked, eliminates the possibility of errors frequently found in trend-line diagrams when a less amount of data is available.

By determining the cost of an engine or car from the data in the basic reports for the period 1910 to 1914 and then increasing the cost for the type of equipment in question to later years by the use of these index numbers or trend lines, the cost of equipment in later years can readily be obtained. The advantages of this method are its simplicity and the small expense required to produce the index number or trend line for various types of equipment each year.

This method of using index numbers to adjust prices from one year to another was little known and rarely used before 1914. Since the war, index numbers have been extensively used. The writer knows of several contractors who have found it practical to adjust their basic prewar detailed cost data to recent years by the use of index numbers and this method has made available their prewar records at small expense for use in estimating cost of construction in recent years.

The U. S. Bureau of Labor Statistics issues each

month index numbers for many commodities, based on wholesale prices, which are of great value for general use. When carefully determined they are remarkably accurate, at least for short periods, and have proved much more accurate than at first supposed by many engineers.

As the reports were completed, copies were always delivered to the Director of the Bureau of Valuation and freely discussed with him. When the Locomotive Report was finished the Director asked if the report was

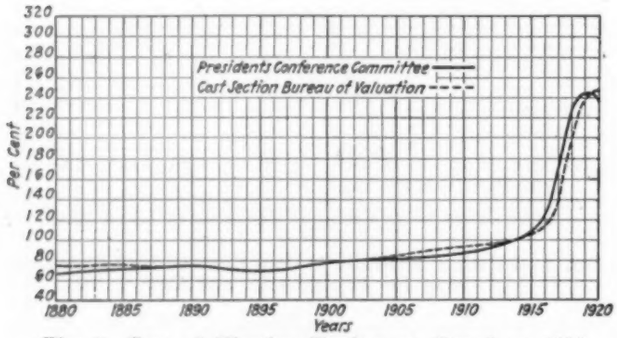


Fig. 6—Cost of Floating Equipment, Based on 1914 as 100 Per Cent

adopted by the Government, what authority had our committee to compel the carriers to follow the report in their valuations. Our chairman, Mr. Gardner, promptly answered that he didn't have even the authority to bind his own company but that if any one could show him how any court or tribunal could ignore the careful analysis of the actual sales price of 9,000 locomotives he would endeavor to get the proposed authority. At this point it was promptly agreed that all these reports stood on their own base as a statement of facts and required no "authority" to compel their use.

Cost of Floating Equipment

It is very difficult to determine the cost of floating equipment by any other method than by the study of the detail plans and the application of unit prices to all materials. This is because each ship is an individual piece of equipment and different from all other ships.

Prices of vessels are sometimes quoted per gross ton, but a gross ton in shipping is in fact the cubical contents inside the "envelope" divided by 100, or a gross ton of vessel is 100 cubic feet. This is not as a rule considered a satisfactory cost unit, although sometimes this unit, when applied to a single class of equipment of approximately similar design, is fairly accurate.

The use of a weight unit, such as dead weight ton, was found to be impractical, because the dead weight of a vessel is not always known and to determine this figure is sometimes very expensive. Because of these conditions, the committee adopted the method of determining the cost of reproduction of a vessel for any year by adjusting the original cost of the vessels.

The average trend of cost of vessels finally approved by the Equipment Committee and a similar trend line approved by the Cost Section of the Interstate Commerce Commission are shown in Fig. 6. The solid line was the average of five trend lines submitted to the Committee from five large ship-building firms showing the change in the cost of building ships. This line was checked by many individual purchases and was adopted only after extensive discussion with the officers of the five ship-building companies.

The dotted line was determined by the Cost Bureau of the Interstate Commerce Commission based on the sale of 1,600 ships, which were classified and the trend determined on the basis of price per gross ton (100 cu. ft.) of similar vessels, together with studies of other data collected by the Government. The similarity of the two lines up to 1914 is a remarkable check of both curves, as they are based on entirely independent data.

After 1914, the deviation of the two curves is because the Equipment Committee's curve was based on the date of the contract, whereas the Cost Bureau's curve is based on the date the vessel was put in operation. This use of different dates ordinarily would not materially affect a trend line but in the great upheaval of prices during the war it caused considerable variation, although the peak of prices for both lines at the end of the war was practically identical.

Many Uses of This Data

These reports on cost of railroad equipment were originally made for the sole purpose of determining the cost of reproduction new of this equipment for valuation purposes. However, they have been used for many other purposes, such as for determining the value of coal cars of a certain coal company for taxation; as a check of the trend of cost of machinery by a certain manufacturer; by the Federal Reserve Bank of New York in its reports on trend of prices, and by accountants for estimating original cost of equipment to be retired.

This general use of these reports, not only by the railroads but by outside companies, is probably because of the simple form in which the data were presented and the accuracy and care with which the great volume of data were assembled, analyzed and reported.

The Personnel of the Equipment Committee

The membership of the Committee to whom this question was assigned changed during the progress of the work. The full list of those who at some time served on the committee is, as follows: J. Howland Gardner, vice-president, New England S. S. Co., chairman; D. F. Crawford, general manager, Pennsylvania; F. F. Gaines, superintendent of motive power, Central of Georgia; H. E. Hale, vice-chairman, eastern group, Presidents Conference Committee; F. H. Hardin, Assistant to president, New York Central Lines; C. T. Ripley, chief mechanical engineer, Atchison, Topeka & Santa Fe; P. F. Smith, Jr., works manager, Pennsylvania; W. J. Tollerton, general mechanical superintendent, Rock Island Lines; R. J. Turnbull, mechanical superintendent, Missouri Pacific; F. O. Walsh, superintendent motive power, Atlanta & West Point; W. H. Wilson, assistant to first vice-president, Northern Pacific, and W. L. Wilt, special equipment representative, Pennsylvania.

The Floating Equipment Committee was made up of the following members: J. Howland Gardner, vice-president, New England S. S. Co., chairman; Warren T. Berry, superintendent of marine construction, New England S. S. Co.; F. L. DuBosque, superintendent of floating equipment, Pennsylvania; A. S. Hebble, superintending engineer, Southern Pacific S. S. Lines and W. B. Pollack, manager, marine department, New York Central.

These committees were ably assisted by representatives from equipment companies who not only furnished the underlying data but gave most helpful advice as to how our problem should be solved.

Contract and Car-Load Buying Popular Upon Railroads

Reflect planning of needs by purchasing agents to speed deliveries and secure best results

Railways Do Much Buying in Car-Load Quantities

CONTRACT and car-load buying continue popular in railway purchasing, notwithstanding "hand to mouth" tendencies in business at large, and the "cost to line" basis of price quoting prevails, judging from the terms under which representative roads negotiated for materials and supplies in 1928. As reported to the *Railway Age* in connection with data regarding price levels and trends in 1928, one of the 13 roads reporting on the subject brought only 1 out of 57 representative commodities under a term agreemen with dealers and that was cement. In contrast with this, however, the next lowest road in the list of 13, reported contract buying in connection with 9 items out of 57, while on other roads, contract buying ranged from 29 out of 58 items reported to as high as 52 items of 66 reported, or well above 50 per cent. There was contract buying in 345 out of 750 transactions or 46 per cent. The figures for the different roads are given in Table I.

The extent of the contract buying in specific lines of purchasing is analyzed in Table II. Term agreements particularly featured the negotiations for iron and steel products used in the repairs of locomotives and cars, brake shoes being bought under contract on 10 out of 13 roads reporting, steel castings, couplers, spring steel and tool steel on 11 out of 14 roads, locomotive tires on 12 out of 14 roads, car and locomotive axles on 9 out of 14 roads, bar iron on 7 out of 13 roads and boiler tubes, and machine bolts and malleable castings on 9 out of 14 roads.

Contract Buying Over 50 Per Cent in Iron and Steel Products

In connection with roadway materials, cast iron pipe was bought on the open market in all instances reported, but contract buying featured purchasing on 4 out of 14 for tie plates, 5 out of 14 roads for track bolts and the same for track chisels, while 6 of 14 roads bought track spikes on contract. Considering all iron and steel products, contract buying ran over 50 per cent.

Where continuity of purchasing was involved, there was considerable contract buying in connection with miscellaneous materials; thus, 4 out of 14 roads bought glass under contract; 6 out of 13 roads, air brake hose; 7 out of 13 roads, leather belting and wire rope; 8 of 12 roads, grease; 11 of 13 roads, car oil; 7 of 9 roads, journal bearings; 12 of 14 roads, oxygen, and 8 of 13 roads, soda ash. Lumber was invariably bought in the open market but contracts figured in over half of the purchasing of fuel and fuel oil. Throughout the list of 66 commodities, there were 361 cases of contract buying out of 799, or 50 per cent.

Buy Castings and Lumber by Car Load

Judging from the statistics reported in connection with the prices paid by various roads for materials, there was also considerable car-load buying last year. Track bolts, track spikes, tie plates and similar track material were bought almost entirely on the car-load basis and the same is true of such car and locomotive material as couplers, steel castings, brake shoes, boiler steel, axles, tires and wheels.

Table I. Analysis of Miscellaneous Purchases by Class I Roads

Road	Number of commodities	Number purchased under contract
A.	59	14
B.	49	37
C.	56	9
D.	48	13
E.	57	2
F.	56	34
G.	66	52
H.	57	32
I.	61	39
J.	58	29
K.	62	35
L.	66	33
M.	55	16

There was almost complete car-load buying of car oil, chemicals for water treatment and cement; also for fuel, fuel oil and kerosene and for all lumber and ties. Journal bearings were bought on a car-load basis on 4 out of 9 roads, fire brick on 8 of 13 roads, boiler lagging on 6

of 13 roads, waste on 7 of 12 roads, white lead in oil on 2 roads, sewer pipe on 2 roads and creosote on 8 of 11 roads, bringing the car-load basis of buying to 406 cases of 799 cases reported throughout the list of commodities studied.

Contracts Show Planning

While contracting with certain firms for anticipated needs or to buy in car lots when current needs do not require it, are deviations from hand-to-mouth buying in the strict sense, it is well to note that in actual practice the deviations may not always be as large as they appear. This is because the typical railway contract, while naming the vender and the price, does not obligate the railroad to purchase beyond current requirements, also because they are frequently written to give the buyer the benefit of reductions in price that may develop while the agreements are in effect. Under this kind of a contract, it is apparent that a railroad may buy under term agreement and still virtually follow hand-to-mouth practices, the contract plan simply indicating the road's effort to anticipate its needs far enough ahead to insure that current requirements can be obtained quickly.

Table II. Representative Materials Purchased in 1928

Item	Total roads reporting purchases	Roads purchasing on term contracts	Roads purchasing on car load basis
Iron and Steel			
Axles, locomotive driving	14	9	10
Axles, rough turned, car, 5 by 9	14	9	10
Bar iron, common	13	7	6
Boiler steel	14	9	10
Boiler tubes, 2¼ in. No. 11	14	9	12
Bolts, machine ¾ by 6	14	8	5
Brake shoes, freight	13	10	9
Castings, grey iron green sand	11	8	3
Castings, malleable 7 to 15 lb.	14	9	2
Castings, steel 25 to 50 lb.	14	11	3
Couplers, 5 by 7 by 6½	14	11	9
Nails, wire	15	12	10
Pipe, 1 in. black steel	13	6	6
Pipe, cast iron, 12 in. B. or C.	12	0	4
Sheet iron, black No. 28	12	7	4
Spring steel	14	11	4
Tires, locomotive, over 33 in.	14	12	12
Tool steel, high speed	14	11	0
Tie plates, steel	14	4	12
Track bolts	14	5	14
Track chisels	14	5	1
Track spikes	14	6	12
Miscellaneous Materials			
Copper tubing, ⅜	12	1	0
Copper wire, No. 9 bare	11	0	1
Journal bearings	9	7	4
Fire brick	13	2	8
Boiler lagging	13	8	6
Glass, 24 by 24 dsa	14	4	0
Car oil	13	11	10
Grease, driving	12	8	4
Waste, colored cotton	14	5	7
White lead in oil	14	5	2
Hose, 1½ air brake	13	6	2
Leather belting, 6 in. double	13	7	0
Fence, 26-in. woven wire	11	7	7
Pipe, vitrified clay, 24 in.	10	2	2
Track shovels, No. 2	15	6	2
Oxygen	14	12	2
Creosote oil	11	4	8
Soda ash	13	8	11
Lime, hydrated	13	4	10
Cement	14	3	14
Fuel and Lumber			
Coal, bituminous	14	9	14
Fuel oil	14	9	14
Kerosene	14	8	14
Boards, fir	10	0	10
Boards, pine	8	0	8
Car sills	12	0	12
Stringers	12	0	12

With reference to car-load buying, it should also be kept in mind that while all attempts to purchase in car-load lots are inconsistent with strict hand-to-mouth procedure, except where current requirements naturally amount to car loads, a car-load designation in price schedules may often indicate merely that the road has secured a car-load price for l.c.l. orders; in other words, the dealer has offered a car-load price to get the business. There were two instances of this kind reported in connection with track bolt purchases, three in connection with track spikes, two in connection with tie plates, one each in connection with track chisels, shovels, wire fence, bond wire and cast iron pipe, two in connection with structural steel angles, one in connection with kerosene, one in connection with wire rope and machine bolts, three in connection with boiler tubes, one in connection with brake shoes, two in connection with couplers, three in connection with fire brick, two in connection with locomotive tires and boiler steel, one in connection with grey iron castings and malleable castings, two in connection with axles, one in connection with grease.

F.O.B. Line Prices Favored

It is evident from the analyses of prices paid by railroads for material that different roads use different methods in purchasing the same kind of commodity. Thus some commodities are bought on the basis of the price at the mill, factory or mile, with the railroad paying the freight, while other commodities are bought at prices, including the freight to the line or the business is awarded on the basis of the cost from a designated shipping or junction point or on the basis of the cost to destination with or without a freight allowance. The statistics examined show, however, that the cost-to-line basis of purchasing is the most prevalent method at the present time with the f.o.b. mill or factory basis ranking second. There were 7 instances of f.o.b. line buying to 6 of f.o.b. mill buying for track bolts; 5 to 6 for track

In the Locomotive Material Yard of the Southern Pacific at Houston, Tex.

spikes; 6 to 7 for tie plates; 4 to 9 for chisels; 8 to 4 for track shovels; 5 to 6 for wire fence; 2 to 5 for bond wire; 5 to 5 for cast iron pipe; 5 to 3 for clay pipe; 8 to 3 for structural steel angles; 5 to 3 for fabricated steel; 7 to 3 for kerosene; 12 to 1 for manila rope; 8 to 2 for wire rope; 8 to 2 for creosote oil; 8 to 3 for machine bolts; 7 to 4 for boiler tubes; 7 to 3 for copper tubing; 11 to 1 for pig lead; 2 to 1 for pig iron; 6 to 4 for bar iron; 4 to 4 for sheet copper; 1 to 9 for tool steel; 4 to 7 for brake shoes; 11 to 1 for couplers; 6 to 1 for journal bearings; 8 to 2 for fire brick; 6 to 4 for tires; 5 to 7 for spring steel; 3 to 6 for black steel; 5 to 7 for boiler steel; 8 to 1 for steel castings; 7 to 2 for grey iron castings; 8 to 1 for malleable castings; 7 to 6 for axles; 8 to 1 for car oil; 8 to 2 for grease; 8 to 1 for waste and 7 to 4 for fuel oil, or a total of 450 transactions on an f.o.b. line basis to 225 on an f.o.b. mill, factory or mine basis.

It is the general rule on railroads to buy supplies according to current requirements rather than to gage buying according to the prospects for higher or lower prices. One reason cited for this is the difficulty of estimating in advance either the requirements or the prices with sufficient accuracy to encourage speculative buying. Some idea of the problem in this connection is indicated in a comparison (the first of its kind made), of the opinions expressed by representative railway buyers at the close of 1927 as to what the volume of buying and the prices might be in 1928 and their corresponding opinions at the close of 1928 as to what the volume of buying and the prices actually were in that year.

Considering only those opinions that afford comparison, that is, where an opinion expressed in one year could be matched with an opinion from the same person expressed in the preceding year, respecting the same commodities, an analysis brings out that only 5 out of 9 buyers correctly estimated in 1927 the trend that their fuel purchases would take in 1928 and only 3 out of 7 correctly estimated the trend of their fuel prices. Only 4 out of 8 buyers correctly estimated rail purchases and only 3 out of 6 correctly estimated the trend of iron and steel prices. Only 2 out of 7 correctly estimated the trend of their tie purchases and 3 out of 6, the trend of their tie prices; only 4 out of 7 correctly estimated the trend in the volume of their purchases of other material; 3 out of 7 the trend in the volume of their lumber purchases; 2 out of 7, the trend of their lumber prices, and 3 out of 6, the trend of their scrap prices.

No attempt was made in the foregoing analysis to measure the degree of accuracy in forecasting but simply to ascertain whether the reported volume of purchasing or the reported trend of prices in 1928 was the same as that anticipated by buyers at the close of 1927 or the same as they were prepared to face.

* * *

Heavy Freight Locomotive on the D. & R. G. W.

Reciprocity Buying—the Ball-and-Chain of Distribution*

By C. D. Garretson
President, Electric Hose & Rubber Company

IF we are ever going to improve the present demoralized state of our distribution we shall first have to eliminate a number of business practices that are responsible for a considerable amount of confusion and unnecessary cost. Among these practices I am familiar with none that is more demoralizing than reciprocity buying, a method of forcing business which is growing and creating numerous costly evils. In reality this practice not only suppresses competition, but it constitutes a boycott in effect; a form of commercial bribery, and is uneconomic from every viewpoint.

Because I use these sinister expressions to describe a widely prevalent business practice, I do not want to be charged with unfairly criticizing or condemning other business concerns. In the majority of cases, I am sure, reciprocity buying is engaged in with no thought as to its disastrous influence, and in numerous instances its results are charged to other causes. As it happens, it has always been the habit of my company to consider every proposed practice or change of policy by thinking it through to its probable consequences, and for this reason we not only refused to engage in reciprocity buying, but have carefully studied its results. Therefore, I feel that our observation should be of value to individual companies and to some of the analytical specialists who are striving to solve our distribution problems, by calling their attention to the cause of a demoralizing and costly distributive burden.

It is no secret that a number of the largest manufacturing concerns in the country furnish their purchasing departments at regular intervals with lists of the names of manufacturers and others who have bought their goods, with the amounts purchased, and with positive instructions to confine purchasing to them as far as possible. And it is amazing the extent to which this unsound practice has been adopted. It influences the buying of almost every commodity. Every day our salesmen report that they cannot sell some manufacturer for the reason that we do not use his products, or that a wholesaler will not carry our goods because he has a reciprocity agreement with some manufacturer from whom he must buy.

In this proposition there is no consideration of quality, price or terms, promptness of delivery, the salability of products, or the merchandising assistance offered the wholesaler.

For the reason that the practice excludes manufacturers and wholesalers from competing openly on a fair basis, it constitutes a boycott. A reciprocity buyer simply boycotts all sellers who do not allow him to select their sources of supply. And in many instances the purchasing agents are guided by means that are highly questionable, if they are not illegal.

While commercial bribery is not a pleasing phrase with which to name a practice engaged in by many large and reputable business concerns, there is no doubt in my mind that it applies to reciprocity buying. If, in order to secure a share of a manufacturer's business, it is necessary for me to give an order on which, let us say, there is a profit of five hundred dollars, I see no

*From "Sales Management and Advertisers' Weekly," February 16, 1929.

difference in principle in handing him a check for five hundred dollars.

In the first instance, practically every reciprocity buyer in our line of business would consider the proposition; but if I offered the profit on the order, in the form of a check, he would probably throw me out of his office. However, the inevitable results that follow both transactions are just about identical, as far as distribution is concerned.

It is a simple matter to trace down the major evils of reciprocity buying in any organization that operates under this policy, and one of the worst is the demoralizing effect on the morale of many of those who are responsible for the success of the business. Good purchasing agents are employed because of their knowledge of commodities and markets and their ability to buy goods economically. When their hands are tied by reciprocity agreements they are prevented from giving their best service, and they naturally resent the imposition. It is the same with superintendents and foremen, for although they are held responsible for the quality of the output, they are not allowed to select some of the important materials necessary for production.

From the same cause, delays and hidden losses are a serious detriment to production. As an example, not long ago the superintendent of a large manufacturing concern told me that the completion of fourteen units, in each of which about $30,000 was invested, had been held up for several weeks awaiting equipment costing only $130 a unit, bought from a reciprocating manufacturer who could not make delivery. In this case a good customer was compelled to wait for his shipment, interest on the manufacturer's investment accumulated and ate into profit, storage space was unnecessarily occupied, the routine of manufacture was disturbed, and the production force was considerably disorganized.

The superintendent who related the experience told me that he requested the purchasing department to buy the equipment from another company whose goods he had previously used and found superior to the equipment ordered. The purchasing agent replied that he could not order the goods elsewhere, since he was under instructions to adhere to the reciprocity policy, and added that for all he cared the production could remain unshipped until it rotted.

Similar costly results occur in every business organization that operates under the policy of reciprocity buying. It costs money to buy goods intelligently, and every unintelligent influence on the buying makes the goods cost more. It costs money when any group of producing workers becomes discontented and discouraged. Both manufacturing and selling costs are increased when goods are delayed and when inferior materials are used in their production and these are but a few of the manufacturer's liabilities that are correctly charged against the reciprocity buying policy.

In the transportation of commodities we also find a burden of unnecessary cost and a disorganizing influence due to the reciprocity policy. Frequently my own company receives orders with instructions to route the goods over three or more railroads, and by roundabout ways, requiring extra hauls of hundreds of miles. Investigation of a number of these cases has disclosed that the buyers involved had reciprocity agreements with a road or two, or wanted the evidence of patronage necessary to sell the purchasing agents of certain railroads. In the transportation field the practice is quite common, and the total waste it is responsible for is a heavy burden on our shipping. The manufacturers who reciprocate with the railroads fail to consider the fact that the cost of hauling a carload of goods one unnecessary mile creates an appreciable cost burden that must be paid by some one.

Not only is reciprocity buying directly responsible for the costs and evils I have mentioned, but its indirect influence is annoying and dangerous. Almost every day our officials and salesmen are requested by customers to go to manufacturers from whom we buy and influence them to purchase certain materials. Some of these requests are far-reaching in their scope. Recently we were asked to induce a company which represents us in a foreign territory to give their shipments of our goods to a certain steamship line, and the fact that the requested line did not give as good service as the line that has the business was ignored by the firm that made the request.

The unsoundness and danger of this policy are quickly realized when we imagine the possible ultimate development of the practice of reciprocity buying. Suppose that all of our merchandising was governed by this policy. Our present system of distribution would break down entirely and our selling effort would resemble the activity of a hungry dog chasing his tail. The prices of all commodities would increase rapidly; quality production would be discouraged, for the reason that manufacturers would not have a free hand in buying raw materials, and our merchandising would soon be reduced to a system of barter and horse trading. I can't imagine anything worse for the general business of the country than the possible ultimate development of reciprocity buying, and we should realize that the possible complete demoralization suggests the extent to which the practice is responsible for the present condition of distribution.

When the results of the practice are even casually examined, it seems strange that reciprocity buying has the tacit approval of so many of the officials of our large concerns. It has not solved any of the problems of overproduction, and it has increased the problems of distribution and management. It is one of the dangerous results of the blind desire for volume at any cost on the part of manufacturers and distributors who have forgotten that today's mistakes must be paid for tomorrow. Carried far enough, the practice would bring about a discriminatory war that our industrial system would not recover from during a generation.

It seems stranger still that the most energetic practitioners of the policy are large industrial concerns that employ staffs of economists and statisticians to ascertain facts and figures for the guidance of the officials of the companies. I feel certain that if just one of these companies will scientifically investigate this subject of reciprocity buying, as it is practiced by the company's purchasing department, it will promptly abandon the practice when the results are disclosed. Furthermore, if the company will publish the facts of its investigation, I am sure that it will do a great deal toward eliminating from our distribution system one of its most costly and demoralizing burdens.

CIRCUIT JUDGE JOHN W. CALHOUN at St. Louis, Mo., on March 6, granted the Illinois Central a new trial of the case in which O. Ferguson, a car inspector at Mound City, Ill., sued the railroad for $96,000 for the loss of sight and other injuries received on September 25, 1926, at Cairo, Ill., when an air tank exploded. Recently a jury in the St. Louis Circuit Court granted him judgment for this amount. Judge Calhoun held this to be excessive and on that basis granted the new trial.

Crossing Protection Installed Extensively on the Milwaukee

Recent installation of wig-wag, flashing-light and rotating disk types of signals has increased safety and reduced cost of operation

By L. B. Porter

Assistant Signal Engineer, Chicago, Milwaukee, St. Paul & Pacific, Milwaukee, Wis.

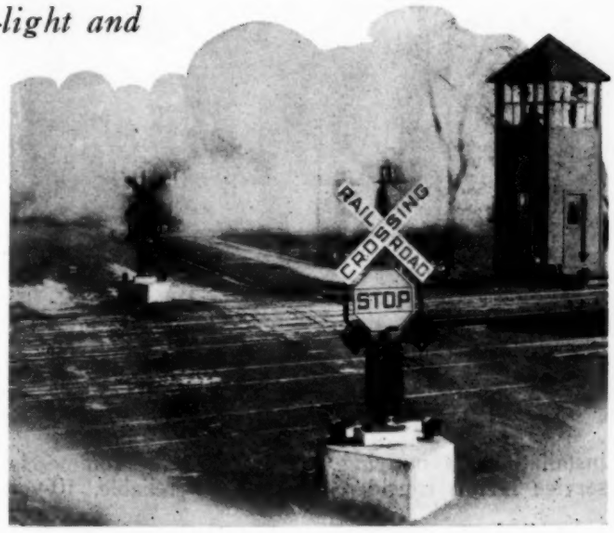
A GREAT deal of consideration is now being given to means of providing protection for the public at street and highway grade crossings of railroads. The objective is, of course, to afford maximum protection at minimum cost. Different schemes of control, automatic, manual, or a combination of both, are being used. In many instances, centralized manual control of signals at several crossings is feasible. Where only part-time manual protection had been in effect previously, the installation of crossing signals arranged for operation throughout the 24 hours increases the safety. When this, together with other features, such as greater effectiveness, flexibility and dependability, are fully explained, city authorities are more ready to go along with the idea of replacing the older forms of protection.

Griswold Signals Installed in Twin Cities

During the last year and a half, 88 Griswold signals, including 11 of the traffic type, have been installed at crossings on the Chicago, Milwaukee, St. Paul & Pacific in St. Paul, Minn., and Minneapolis. This type of signal was adopted as a result of a number of conferences with the city planning engineer, traffic committee and other city officers. The most recent installation, consisting of 50 signals providing protection for 19 adjacent street crossings, is probably one of the largest single installations of its kind ever made.

The 19 crossings are located between the Minneapolis passenger station and South Minneapolis, at which point the tracks from St. Paul and East, the Iowa and Minnesota division from the south, and the Hastings and Dakota division from the west, converge. In addition to trains of the Milwaukee, the Chicago, Rock Island & Pacific and the Minneapolis, St. Paul & Sault Ste. Marie also operate over the Milwaukee tracks in this territory. A total of 140 regular trains are scheduled over these crossings daily and in addition a great many coach and switching movements are made. The number of tracks over the crossings varies from 5 to 11. The right-of-way cuts diagonally through a highly congested area of the city, intersecting several streets on which the traffic is exceptionally heavy. A number of the streets carry over 15,000 vehicles in eight hours, in addition to a heavy street car movement.

A total of 66 manually-operated gates were removed from the 19 crossings. Twenty-four-hour protection is now provided in place of 10- and 18-hour protection previously furnished at all except three of the crossings. The number of accidents occurring at these crossings has been materially reduced, indicating that the new signals are likely to be more effective than the old gates.



Rotating Disk-Type Crossing Signals at 24th Street, Minneapolis

Description of Signals

The distinctive feature of the Griswold crossing signal is the octagonal yellow "Stop" sign which is turned parallel to the street traffic when the crossing is clear and is thrown at right angles, facing the traffic when a train is approaching. It is securely locked in each position so that tampering is not possible. The "Stop" sign is turned to the "Clear" position by a motor, and held there by a compound-wound magnet, and it is restored to the "Stop" position by a weight which is lifted by the operation of the motor. Standard Signal Section, A. R. A. type, flashing red lights are mounted on each side of the stop disk.

At present, 50-watt lamps are used in the flashing signal units although smaller lamps could be used and still give a satisfactory indication. A floodlight is provided to illuminate the cross-bucks. Base lights are furnished where signals are located in the center of the street. Base and floodlights are controlled by a sun relay where manual attendance is not provided. The signals in these installations are operated direct from 110-volt commercial power. As the "Stop" sign will be displayed automatically by any interruption of the current supply, a reserve is not considered necessary.

The total current consumed by the 110-volt signals in heavy traffic territory averages 40 kwh. per signal per month. A large part of this is, of course, accounted for by the illumination of the cross-bucks. The hold-clear magnets require 5 watts, while the motor requires 200 watts for a fraction of a second in turning the stop sign, and the flasher relay, 0.1 amp. On other

Flashing-Light Signal at Rockford, Ill.

installations at outlying points where the commercial service is not considered sufficiently reliable, 10-volt d-c. signals with storage battery reserve are used. The hold-clear magnets of these signals require 7-m.a. Ten or 18-watt lamps are used in the flasher signals.

Manual Control

All of the Griswold signals installed in the Twin Cities are manually controlled. Each watchman usually controls a group of several crossings, the number depending upon local conditions as to location, view and amount of traffic. Altogether there are 12 control towers for the 38 crossings and the greatest number controlled from any one point is 6. The circuit scheme is simple and entire control of the signals at a crossing is effected through a single lever. By the use of a contact that makes when the signal displays "Stop," the necessity of providing individual control wires for each set of flashing lights is avoided, as a number of signals can then be connected in multiple.

Unusual Conditions at Street Intersection

A difficult problem was presented at the Cedar and Franklin avenue crossing in Minneapolis, because these streets intersect at the railroad tracks. The crossings are located at the end of the coach yard where switching and train movements are so heavy that a train director is required. There is a street car line on each street and these car tracks also intersect on the railroad crossing. In addition a double-track connection extends between the two car lines which turns at the crossing. Street traffic at this point is very heavy. An idea of the complications may be gained from the track diagram.

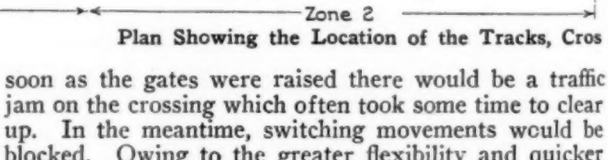
To take care of this situation, a combination of railroad crossing and traffic signals was worked out. Standard manual control is provided for the four crossing signals. The traffic signals are arranged for automatic time changing, and a control panel is provided so that a city policeman can take over the control during rush hours. The circuits are, however, interconnected so that all of the traffic signals indicate "Stop" whenever the crossing signals are operated to give warning of a train movement.

The crossing watchman assumes complete control at any time by simply throwing one of his levers to the "Stop" position. When he does this, a system of relays operates to cut out all interference on the part of the policeman and also of the time control. When the train has passed, the watchman clears the signals for the street which he considers should be cleared first. As soon as the crossing signal is cleared, the traffic signals for that street automatically turn to "Go." When the crossing signals for the other street are cleared, the traffic signals there change to "Go" and those on the opposite street to "Stop." Time control is cut in through a push button.

This selective control has facilitated switching movements because frequently under the old arrangement, as soon as the gates were raised there would be a traffic jam on the crossing which often took some time to clear up. In the meantime, switching movements would be blocked. Owing to the greater flexibility and quicker action of the signal system, advantage can be taken of short intervals, between switching movements, to release street traffic, which was not possible with the slower operation of the gates. Street traffic is thus speeded up.

Some of the other special features connected with this double crossing are: (1) Longer timing of the "Traffic Change" for signals on one side, to prevent vehicles from being caught on the tracks by the op-

Plan Showing the Location of the Tracks, Cros



Plan Showing the Signals, Street Car Tracks and Steam Lines at the Crossing of Franklin and Cedar Avenues

posite stream of traffic, because of the greater distance to be traveled from that side on account of the diagonal nature of the crossing; (2) elimination of the "Traffic Change" from "Stop" to "Go"; (3) the co-ordination of manual with time control; (4) the use of indicators to tell the policeman when he has control and to aid the watchman in synchronizing his control.

While the circuit scheme is naturally rather complicated, the actual control and operation are quite simple. Both the railroad officers and city authorities are enthusiastic over the new signal system. The crossing signals (except where supplemented by traffic signals) are considered "Stop and Proceed" signals rather than "Stop and Stay." The stop is, however, required by city ordinance and state laws when the signal so indicates. Inasmuch as the "Stop" sign is identical with that which is now being used nationally at highway intersections and other points, the observance of the signal has been very good and the number of accidents has been materially reduced. Bells are not considered necessary with this type of signal and are not used.

Flashing Light Signals in Other Cities

Signal Section, A. R. A., flashing-light signals were installed recently at six crossings in Rockford, Ill. The signals at five of these crossings are grouped under a single manual control and at the other crossing the operation is automatic with track circuit control. Formerly four of these crossings had part-time gate protection and the other two were unprotected. The installation of the signals, in addition to affording better protection, has resulted in a saving in operating expenses.

These signals are operated direct from a-c. power with a central battery of seven large capacity storage cells for reserve. One of the signals at each crossing is equipped with a bell, and the bells, together with the flasher relays, are operated from the storage battery. Signals were placed at the side of the street and pilot lamps were, therefore, not required.

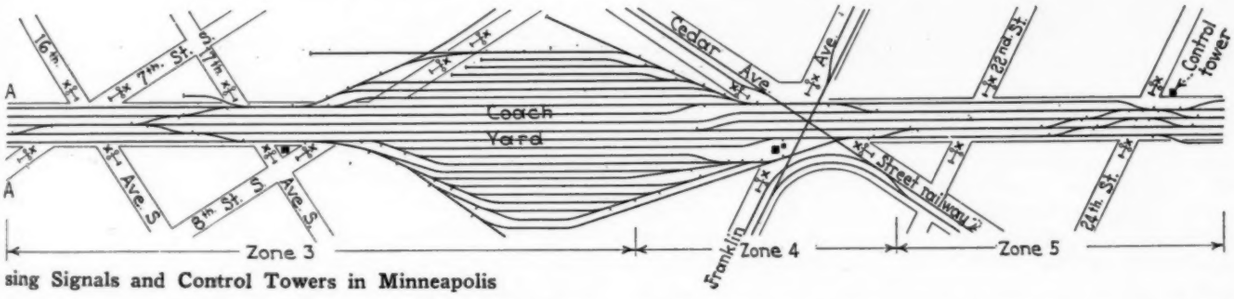
One crossing is located at a distance of about 900 ft. from the control tower, and for that reason a track indicator is provided to show when trains are approaching or have cleared the crossing. The use of such indicators often makes it possible to lengthen the control zone so that additional crossings can be included. It is planned to extend this installation so as to include four additional crossings, although in this case the signals will be arranged for automatic operation with time-element "cut-outs" and automatic "restarts" to take care of switching movements.

Wig-Wag Signals Used Effectively

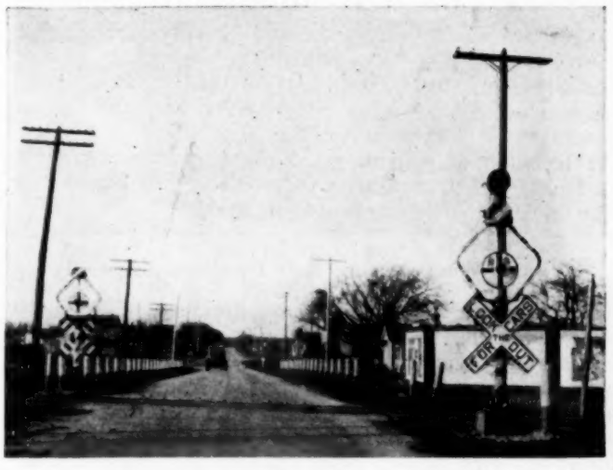
In a recent installation, 10 crossings at Iron Mountain, Mich., were protected by Signal Section, A. R. A., wig-wag signals. This protection was installed as a result of a joint survey made by representatives of the railroads, the city, the chamber of commerce, and the Michigan Public Utilities Commission, covering all crossings inside the city limits. Eighteen signals were installed on the C. M. St. P. & P. and about the same number of crossings on the C. & N. W. The signals are arranged for operation under a combination of automatic and manual control. Standard track circuit, interlocking relay control is provided and, in addition, two men are employed during the day time when most of the switching is done. The controls are arranged so that these men can cut out the signals or put them in operation at any time. Six of the crossings are grouped under one control and four under the other. Track indicators are provided in the towers for the crossings that are located some distance away. Pilot lamps are furnished to show when the automatic control has been cut out.

Two wig-wags are provided at each crossing and they are located in the center of the street where space permits, otherwise they are at the side of the street. These wig-wags are of the low top-of-post type and the banners are equipped with two 18-watt lamps with a reflector behind each. These lamps give a good daylight indication and, with the swinging banner, make an effective signal. There is the added advantage of an indication in each direction. Bells are also used in this installation.

The central battery scheme is used and all signals are operated from three storage batteries which are on a-c. floating charge. Special time elements are provided to cut out the signals at night at certain points where trains stop for orders or water, and automatic "restarts" put the signals in operation again when such trains move toward the crossing.



sing Signals and Control Towers in Minneapolis

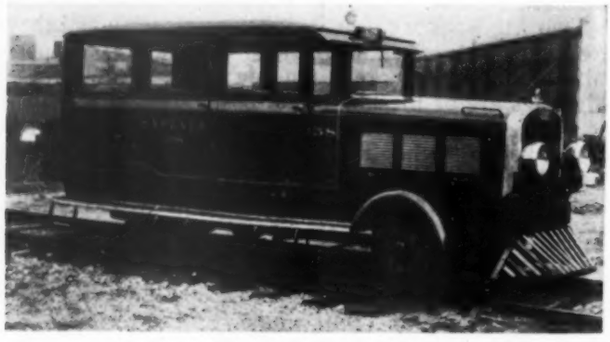


Wig-Wag Type of Signals with Bell

New Buda Auto-Type Inspection Car

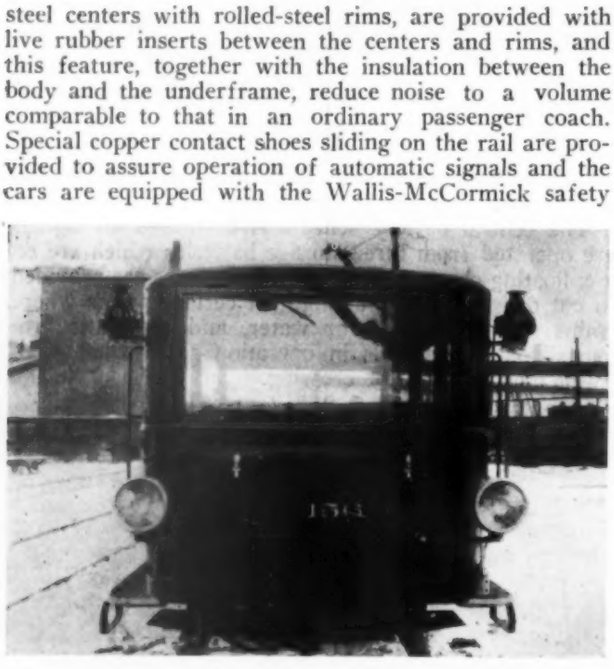
THE Buda Company, Harvey, Ill., has recently furnished three automobile-type inspection cars to the Atchison, Topeka & Santa Fe, which are built on the Buda No. 619 chassis, and which provide seating space for 12 occupants. The rear glass extends practically across the full width of the body while the rear seat is reversed to permit close inspection of the track. The interior of the car is equipped with dome lights, curtains, a heater, leather-upholstered seats and a control board.

The motors of these cars are equipped with governors which can be locked for any predetermined maximum speed. The wheels, which are built-up of cast-



The Car Is Fully Enclosed

steel centers with rolled-steel rims, are provided with live rubber inserts between the centers and rims, and this feature, together with the insulation between the body and the underframe, reduce noise to a volume comparable to that in an ordinary passenger coach. Special copper contact shoes sliding on the rail are provided to assure operation of automatic signals and the cars are equipped with the Wallis-McCormick safety



A Large Window in the Rear Facilitates Inspection

device so that if the wheels are derailed, the car will slide along the top of the rail on steel skids. Headlights are provided at the front and rear of the car, with an adjustable spotlight at the front which casts a beam approximately 1,000 ft. long.

The first car delivered to the Santa Fe was operated under its own power from Harvey to Topeka, Kan., via Chicago, a distance of 534 miles. The car was operated under train orders and is said to have averaged over 7½ miles per gallon for the entire trip, while it averaged 45 miles per hour between Kansas City, Mo., and Topeka, a distance of 66 miles. Another car, driven over Raton mountain on the Santa Fe, is said to have maintained the maximum permitted speed of 30 miles per hour over a continuous grade of 20 miles, on which the maximum rate is as high as 3 per cent and on which there are 11 curves ranging from 3 deg. to 11 deg.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading during the week ended March 2 amounted to 976,987 cars, an increase of 17,493 cars as compared with the corresponding week of last year and a decrease of 12,876 cars as compared with 1927. Coal loading, which totaled 195,072 cars, was principally responsible for the increase in the total over a year ago and for the decrease from the 1927 total. Loading in the Southern, Northwestern and Central Western districts was smaller than in the corresponding week of last year. The summary, as compiled by the Car Service Division of the American Railway Association follows:

Revenue Freight Car Loading

Week ended Saturday, March 2, 1929

Districts	1929	1928	1927
Eastern	230,028	218,188	228,025
Allegheny	196,537	187,109	207,260
Pocahontas	60,045	53,275	57,403
Southern	147,611	156,769	157,781
Northwestern	118,881	125,471	119,089
Central Western	143,051	143,076	143,089
Southwestern	80,834	75,606	77,216
Total Western Districts	342,766	344,153	339,394
Total All Roads	976,987	959,494	989,863
Commodities			
Grain and Grain Products	46,455	53,609	43,469
Live Stock	25,490	30,620	28,031
Coal	195,072	171,700	213,154
Coke	13,854	11,351	12,578
Forest Products	64,190	71,720	69,181
Ore	10,682	8,825	10,086
Merchandise L. C. L.	255,537	258,713	260,474
Miscellaneous	365,707	352,956	352,890
March 2	976,987	959,494	989,863
February 23	907,337	869,417	918,858
February 16	958,051	888,586	954,794
February 9	955,478	906,477	962,602
February 2	946,892	926,262	965,664
Cumulative total, nine weeks	8,315,723	7,999,131	8,548,441

The freight car surplus for the period ended February 22 averaged 222,287 cars, including 76,412 coal cars, 100,658 box cars, 24,789 stock cars and 10,106 refrigerator cars.

Car Loading in Canada

Revenue car loadings at stations in Canada during the week ended March 2 totalled 69,042 cars, an increase over the previous week of 3,516 cars and an increase over the same week last year of 4,792 cars.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada		
March 2, 1929	69,042	48,196
February 23, 1929	65,526	46,449
February 16, 1929	65,516	45,654
March 3, 1928	64,250	43,559
Cumulative Totals for Canada		
March 2, 1929	545,879	376,471
March 3, 1928	564,152	345,737
March 5, 1927	538,568	337,549

FREIGHT TRAFFIC through the St. Louis gateway in February showed an increase of 32,965 carloads compared with the same month in 1928 and was 3,094 carloads better than the January movement. A total of 243,690 carloads of freight were interchanged in the St. Louis district in February.

The Rail Failure Problem—Will It Be Solved?*

The story of the transverse fissure and the detector car, and a glance into the future

By Charles W. Gennet, Jr.
Vice-President, Sperry Rail Service Corporation, Chicago

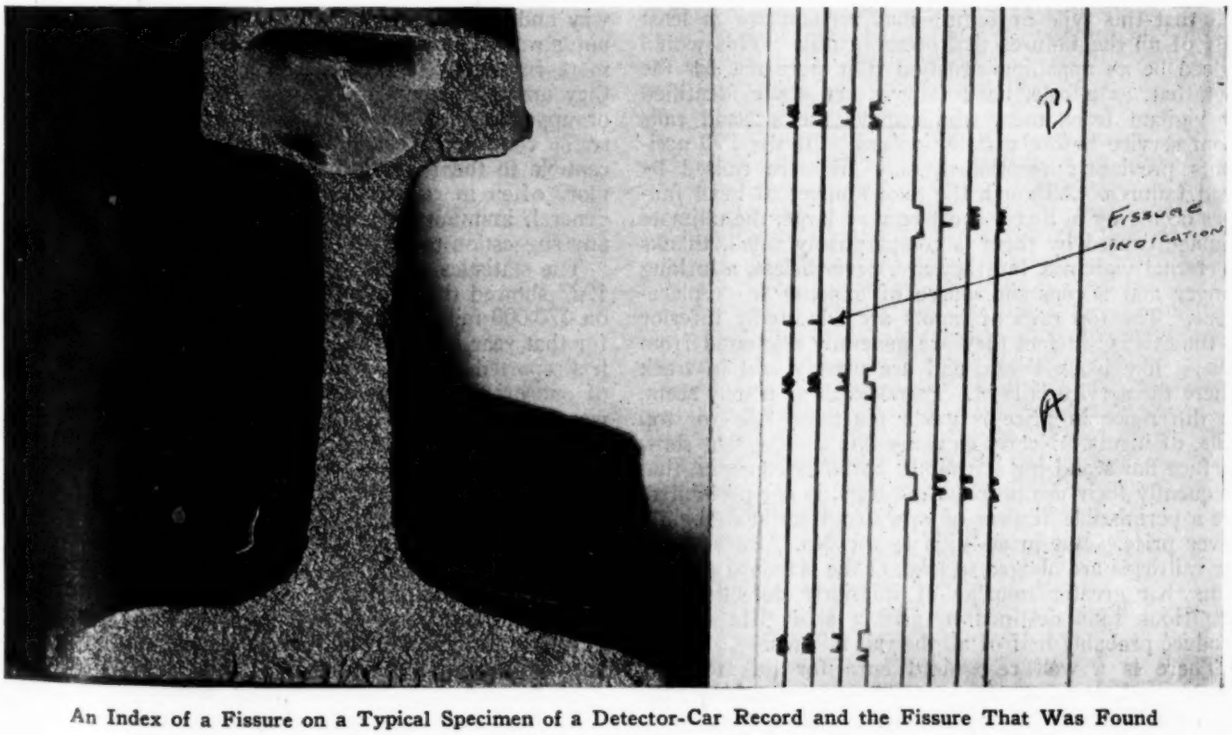
IN 1927 a total of $101,500,000 was expended by the railroads of the United States for steel rails. This was but eight per cent of the total purchases made by the roads that year, and yet only two expense items exceeded it, namely, the expenditures for coal and crossties. In addition, $72,000 was spent for frogs, switches, rail fastenings and the like, which if added to the actual expenditure for rails, means that new rails and their accompaniments really cost the railroads more than anything except coal. Labor is omitted, of course.

In the same year there were 18,975 train accidents, a train accident being "one with or without casualties, arising in connection with the operation or movement of trains, locomotives, or cars, that results in damage to equipment or railroad property in excess of $150." No accident of this character appears to have been directly attributable to coal, for which the most money was spent, but 590 train accidents, resulting in the death of 4 persons and the injury of 180 others, were directly chargeable to rails. In fact, rails, fastenings, frogs and switches were accountable for practically half of the 2,716 train accidents due to defects in or improper maintenance of way and structures. The number of accidents due to wheels, axles and journals was somewhat larger, but they caused less than half the total casualties caused by rails. Of course such figures as quoted change rapidly, for a bad accident, like the one at Victoria on the St. Louis-San Francisco a few years ago, increases very greatly the casualties of the class of accidents to which it may be charged.

Care Exercised in Manufacture

Every steel manufacturer recognizes the supreme importance that attaches to the rolling of rails. Large sums of money are tied up in special mill arrangements, rolls and finishing equipment. An organization for handling rails is a specialized one, not built in a day. The mere fact that only 6 or 7 per cent of the total steel made now goes into rails, compared with 75 per cent in 1880, does not mean that rails are less important today, but rather that other uses for steel have sprung up and grown so rapidly that the proportion of the total now used for rails has decreased tremendously. A peculiar phase of this increased demand for steel is that, except for some employed in automobiles, no new use has developed that requires anything like the special mill equipment, or organization, or exacting attention to details and inspection that rails do. It is axiomatic that the safety of life and limb depends on the safety of the rails made. All those who come in contact with the manufacture of rails, whether they be executives or workmen, feel a certain responsibility, an obligation and pride, that does

* Abstract from a paper presented before the Western Society of Engineers at Chicago on March 4.



An Index of a Fissure on a Typical Specimen of a Detector-Car Record and the Fissure That Was Found

not obtain in the rolling of any other product, and a deficiency in quality of product is much more apt to be due to unintentional faults in carrying out the desired process and program than to willful negligence of the men involved. Without doubt, rails are regarded by the rank and file of the steel manufacturers as the most important product made.

Rails have always been a prolific source of engineering discussion. Let me advise the reading of the early papers and discussions of Holley, Delano, C. B. Dudley, P. H. Dudley, Hunt and Howard. These are only a few of a host in America and Europe that have contributed to the subject, but a rather interesting conclusion that might be drawn from reading such literature in the order of its publication would be the fact that various details of the subject appear to have engaged attention in a kind of progressive but pioneering way. Thus, the sections of rails, although always a fertile field for discussion, were early matched by questions involving the composition of the steel. Later the subject of soundness, meaning chemical and physical homogeneity, appeared as preeminently important; and, needless to say, recent years have brought fissures to the front, until today that subject subordinates almost all others.

Head Failures the Great Problem

It appears that the sections of rails have been so manifestly improved that failures due to faulty section are now comparatively rare. Certainly no one can say that base failures and the like, to which the old thin-flanged sections were subject, are an important issue now. Likewise, web failures have practically disappeared. But head failures and broken rails are an outstanding, and probably an increasing cause, affecting the life of rails, and the fight against broken rails or fissures has been largely negative. In the whole subject of rails, *per se,* it appears plain that the greatest good would be accomplished by measures designed to decrease the head failures and broken rails.

It has been pointed out repeatedly that head failures predominate in the top rails of the ingots, occurring in something like twelve per cent of all the rails shipped, and that this type of failure may account for at least half of all the failures that occur in rails. This would indeed be an appalling situation if it were not for the fact that, as a rule, head failures are easily identified by vigilant track men, who remove the affected rails from service before disaster occurs. Of the 590 accidents previously mentioned, only 13 were caused by head failures. Although the total number of head failures occurring in a year must be very large, the ultimate damage caused by them is comparatively small, thanks to eternal vigilance, but they are, nevertheless, a lurking danger and a constant source of expense for replacement. The top rails of ingots are admittedly inferior to the others; in fact they are generally separated from others, like black sheep, and are usually laid in track where the service is light. Paradoxical as it may seem, no difference in price is made for these "A," or top rails, of ingots. Nearly as many No. 2 rails, that show surface flaws and imperfections, so inconsequential that frequently their use in main-line track is not prohibited, are a permissible feature of every contract at a slightly lower price. But in addition to the No. 2 rails which the railroads are obliged to take, at the standard price, a somewhat greater tonnage of interiorly defective and suspicious rails destined to give a short life and to produce probably half of all the rail failures.

There is a well recognized cure for this top rail trouble and, therefore, for a very large proportion of the total rail failures. Everyone knows that a sweep of a pen would result in the discarding of all the "A" rails. Most of this discarded metal could be rolled into tie plates, practically without change of tonnage conditions or extensive addition to or alteration of mill equipment.

Unfortunately the situation is very different with respect to that great class of failures called broken rails which, of course, includes those due to transverse fissures. Some might say that if "A" rails were eliminated and a corresponding cure found for fissures, the rail problem would be completely solved. I am not so optimistic because of a feeling that then some other problem, possibly of heat-treated rails, would come up for attention. Nor am I optimistic about finding a positive cure for fissures. Even if it were found today, it would not overcome the possibility of disaster arising from the condition of the rails that remain in the 270,000 miles of main-line tracks.

Genesis of the Transverse Fissure

On August 25, 1911 the Lehigh Valley suffered an accident in which 29 persons were killed and 62 injured. The report made by J. E. Howard, engineer-physicist, I. C. C. Bureau of Safety, disclosed the cause to be a broken rail, which showed on its fractured surface a rather peculiar condition for which he coined the very suitable term "transverse fissure." This particular rail happened to be piped as well, and some authorities were prone to regard the pipe as in some way associated with the so-calied fissure and to disagree, therefore, to an extent, with Mr. Howard's early findings. Other cases of broken rails, each exhibiting the peculiar fissure effect, were quickly discovered and very soon it was realized beyond doubt that a new thing—a disease of some sort—had developed, mostly, but not entirely, in open-hearth steel rails. Subsequent facts are well known, so that now it is freely admitted that fissures occur in all kinds of steel rails, of all sections, weights and manufacture, in all parts of the country, in summer as in winter, and to an extent under all kinds of track and traffic conditions, although, perhaps, appearing quicker, and oftener, on heavy-traffic lines. Most authorities agree that fissures grow under traffic, that is, that they begin in a small way and enlarge. Some other facts on which there is not always complete unanimity are that fissures occur more frequently in high-carbon heats than in low, that they are more abundant in rails from near the center, or upper part of the ingot, that regardless of track or traffic conditions certain heats appear to be more susceptible to them than others, and that they may occur more often in rails rolled in cold winter weather. In general, immunity against fissures is the exception and any suggestion to that effect is met with doubt.

The statistics of the A. R. E. A. Rail committee for 1927 showed that 4,596 fissures had occurred that year on 170,000 miles of track, which is at the rate of 7,500 for that year in the United States. One important road has reported that for a year it found fissures at the rate of one every 15 hours. A total of 553 train accidents were ascribed to broken rails in 1927, and the probability is that the death of 4 persons and the injury to 172 others were all the direct result of fissures. A hasty review shows that in the 17 years following the Lehigh Valley accident, at least 59 persons have been killed and 405 injured as a result of fissures. The last bad accident occurred in 1925 on the Frisco and is reported to have cost approximately $750,000. These are startling facts and figures, and serve to emphasize the importance of the most serious condition to which rails have ever been subject in all their history.

Since the Lehigh Valley accident, nearly 18 years ago, there have been endless investigations of various cases,

reports, discussions and studies, always aiming at the hope of finding a definite cause for the evil, but without definite results. Certain facts, it is true, have been well established, but, after all, the greatest accomplishment in the fight against fissures has been through the adoption by the railroads of stringent measures tending to keep the tracks as free as possible from all suspicious rails. The locating of fissured rails has been virtually impossible, although, no doubt, many disasters have been averted by carefully searching for the hair-line cracks and rust marks, indicating that fissures of interior origin had grown to the surface. The enforcement of various rules, restricting further use of all the rails of a heat when a few fissured ones have been found, have also been of value in helping to keep the tracks safe. But few devices for assistance in locating fissures have been offered, the most promising having been a magnetic method which, however, did not demonstrate positive or practical results. Soon after the Frisco accident, which provided renewed opportunity for argument and discussion, the writer called attention in the *Railway Age* to a seemingly neglected phase of the subject, saying, "Although not meaning to detract in the slightest from the necessity of exerting every effort to get at the real reason for fissures, it seems to me that the time has come when attention should be concentrated on the development of a means for detecting weakened and defective rails in track." Dr. Sperry was already at work on his invention for detecting, recording and marking fissures; and the development of it in co-operation with the American Railway Association, and the Rail committee is a feat of such recent occurrence that no recital of it is necessary.

Theory of the Detector

The theory of the detector car is fairly simple. It appears that electricity flowing through a wire, or a rail, is similar to water flowing through a pipe. As long as there is no interior obstruction in the pipe, the water flow is steady and normal, but the imposition of some interior impediment causes various eddies to be set up and the flow becomes abnormal. So in a wire, or rail, an interruption to the straightforward flow of the electric current due to a flaw, or fissure, creates certain impulses at the point of origin. With sufficient amplification, these impulses can be multiplied and made noticeably large. Thus, as Dr. Sperry says, "the skeleton is dragged from the closet," and the defect marked.

As in the case of many simple theories, the application of this one to the testing of rails in track leads to a machine of somewhat complicated and delicate construction. A gasoline motor direct-connected to a generator supplies the direct current used for energizing the rails. Brushes, held down by air pressure, bear on the rail, the incoming and outgoing brushes being about three feet apart, so that such a length of rail is energized on each side of the track. Between the two brushes is the detector. Wires leading from the detector carry the minute impulses to an amplification set, and later through relays to a recording unit which furnishes a paper record of the track traversed. In the circuit, with the recording unit there is a paint gun which shoots daubs of paint on the rails at the point where a defect has actuated the circuit. The detector car is propelled by another substantial motor car capable of maintaining a uniform operating speed of six or seven miles per hour.

For me to give some definite results, even if this were possible, would be much the same as for a banker to discuss the accounts of his depositors. Time will probably tell its own story, and it seems sufficient to say with great emphasis that the detector car works most successfully and satisfactorily. The equipment owned by the American Railway Association and being operated by the Rail committee has covered practically a thousand miles of track on eight or nine different roads. The equipment with which I am concerned has tested nearly as much more. Both cars have repeatedly located fissures of various sizes in rails where no external manifestation of any kind would enable one to predict the presence of such serious defects. Various changes of detail are constantly being made and as time goes on, improvement in method and in operation is bound to result in the further perfecting of what is one of the great contributions to the safe operation of railroads.

All Defects are Recorded

A moment's reflection of the simple theory on which the car is based, makes it evident that everything in the rail that causes an impulse in the detector must be recorded. Thus, surface flaws, spike-maul dents, and burned spots caused by slipping wheels, are easily picked up, while split heads, pipes, horizontal and compound fissures are also recorded the same as the transverse fissures. At first, and in the great enthusiasm to "get" fissures, some might construe this apparent lack of discrimination as a drawback; but, indisputably, the importance of establishing all facts bearing on the integrity of the rails of the track cannot be under-estimated, and the proper interpretation of each indication on the record can be easily made.

A careful surface inspection of the rails should be made, therefore, concurrently with the operation of the detector car, and if no external flaw or defect is visible it may be assumed beyond peradventure that the trouble is of internal origin, and such action may be taken as seems warranted. The detector-car operator should be a party to this inspection for, even if operations are somewhat delayed, he can, if necessary, make additional tests to determine the character of the internal defect, and, in the case of transverse fissures, estimate their size with remarkable accuracy. Thus the record of the track tested can be made of far-reaching importance, unequaled even by the recognized skill of trackmen. Some questions involving the rate of the growth or development of fissures must remain unanswered until time, experience and experiment have determined the best procedure to follow.

It must be obvious that the principle of the Sperry invention can be applied to the testing of various forms of steel other than rails in track. Many parts of automobiles, car axles, locomotive forgings, and pipe offer attractive fields for the application of the method; for concealed defects of one kind and another frequently develop in those parts, especially when heat-treated or welded. The ability of the detector, under an adjustment of fine sensitivity, to pick up all forms of defects, both internal and external, renders it of peculiar aid for testing in many ways; and if it should be considered essential to test newly rolled rails, the arrangements for doing so can be easily consummated. In fact, the desirability of testing new rails by this method is most interesting and attractive, as experiments now being conducted indicate.

What Still Remains To Be Done

It would be extremely unwise to regard the whole subject of rails as having been lately boiled down to the two questions of top rails and fissures. It is true that those two matters stand foremost today, as deserving of the fullest attention. In the case of top rails, the railroads are put to unwarranted expense, anxiety, and risk by the continuance of an indefensible practice; in

the case of the fissures, a constant peril to safe operation can now be overcome very reasonably through the use of the detector car. However, there are many other details of rail manufacture that require investigation. The chemical composition deserves study to determine that which is most suitable for various conditions. Methods for taking the samples of the heats for analysis should be laid down; and physical testing requirements and specifications generally should be revised to conform to the best and latest thought. Moreover, there is the responsibility of the manufacturer. It involves making the steel and casting it into ingots; the treatment and rolling of those ingots into rails, with their subsequent finishing; and finally, the establishment of stringent safeguards against bad practice from any cause in any department.

Regardless of the question whether fissures are the result of stresses caused by traffic, or have their inception in some kind of mill defect, there remains the generally accepted fact that different heats of steel give widely different results in service. Why one heat should develop 40 or 50 fissured rails while rails of another heat, made at the same mill on the same day, under identical traffic conditions, appear to be free from fissures, must be interpreted as due to some fundamental difference in the steel or rails of the two heats and for which the maker is clearly to blame. Post-mortem examinations by the laboratory have failed repeatedly to yield a reason for this, and other peculiar happenings. Opportunity is now open for ante-mortem investigations, for, by locating minute interior ruptures with the detector, the laboratory is certainly able to proceed with its work more intelligently than was formerly the case. Helpful means for promoting study along various lines are now at hand. Perhaps, therefore, the invention of the detector car will not only make for safer railroading, but will also assist the manufacturers in carrying out their well-known desire and obligation to make better rails.

Retroactive Mail Pay Order Upheld

WASHINGTON, D. C.

THE authority of the Interstate Commerce Commission to make its orders readjusting the rates paid to railroads for the carriage of the United States mails retroactive so as to cover the period between the application of the railroad for a readjustment and the date of the order of the commission allowing an increase was upheld by the Supreme Court of the United States in a decision rendered on March 11 in cases affecting the New York Central, as lessee of the Boston & Albany, and the Nevada County Narrow Gauge.

In both these cases the commission had ordered increases on rates, retroactive to the date of the application, and the Postmaster General had refused to make the payments. The carriers then sued in the Court of Claims and got judgment and the government appealed from the decision of the Court of Claims to the Supreme Court.

The principle decided by the court, based on the construction of the mail pay law of 1916, is also involved in a recent order of the commission allowing the railroads generally an increase in rates amounting to approximately $15,000,000 a year, with retroactive payments amounting to about $45,000,000 for three years back. The department had been awaiting the decision in the earlier case before making payments to the railroads as required by the commission's order.

According to the decision by Justice Holmes it was the intention of Congress in the act of 1916 that the commission have authority to make its orders retroactive, and not merely applicable for the future as contended by the Postoffice Department and the Department of Justice. "Unless the commission has the power assumed," he said, "a part of the railroad's constitutional rights will be left in the air," because reasonable compensation for the years occupied in the necessary investigation is a constitutional right of the companies no less than it is for the future.

The decision points out that the act of 1916 made the carriage of mails by the railroads compulsory and says that naturally, to save its constitutionality, there was coupled with the requirement to transport a provision that the railroads shall receive reasonable compensation. The applications by the railroads involved in this case were filed in 1921. The commission at first expressed the opinion that it had authority only to establish rates for the future but after further hearings it issued new orders making the same rates retroactive.

"We assume," the court said, "that while the railroads perform these services and accept pay without protest they get no ground for subsequent complaint. But the filing of an application expresses a present dissatisfaction and a demand for more. If the claim of the railroads is just they should be paid from the moment when the application is filed.

"In fact the necessary investigation takes a long time, in these cases years, but reasonable compensation for the years thus occupied is a constitutional right of the companies no less than it is for the future. This being so, and the Interstate Commerce Commission being the tribunal to which the railroads are referred, it is a natural incident of the jurisdiction that it should be free to treat its decision as made at once. We are quite aware that minutiae of expression may be found that show Congress to have been thinking of the future. We put our decision not upon any specific phrase but on the reasonable implication of an authority to change the rates of pay which existed from the day when the application was filed, the manifest intent to refer all rights of the railroads to the Interstate Commerce Commission, and the fact that unless the commission has the power assumed a part of the railroad's constitutional rights will be left in the air."

PASSENGER TRAVEL ACROSS THE ATLANTIC is likely to be subject to some readjustment this year, according to a statement made by William Baird, passenger traffic manager of the Canadian Pacific Steamship Lines. Among the factors tending to disturb present conditions, is the action of the Canadian Pacific in putting on a weekly service from Montreal to Liverpool. And from New York, the service will be augmented by two new ships to be put on by the North German Lloyd Lines. These ships will be able to make 26 knots, three knots better than the highest average Atlantic speed hitherto. The Holland-American Line is to put on a new de luxe liner of 30,000 tons. The competing lines also are very much interested in the transfer from government to private ownership of the great fleet of the United States Lines. Mr. Baird says that, by 1931, the Canadian Pacific will place in service a 40,000-ton ship, to make the trip from Quebec to Europe in five days. Of the 121 liners now actively competing for the traffic on the North Atlantic, 80 are cabin class liners. Canada expects to maintain her strong position.

Heavier Box Cars Prove Their Worth*

Improved methods of car handling and heavier loading necessary for operating economy

By M. J. Gormley
Chairman, Car Service Division, A.R.A.

WHETHER the equipment provided by the railroads is adequate or not depends upon two things whether or not the equipment is efficiently utilized, and whether or not the car unit itself is most efficient.

If cars are allowed to accumulate in consuming territories, either under load or empty, we have a shortage of equipment in producing districts. It then might be said that there is an inadequate number of units, while the fact would be that it was inefficient utilization, either through failure of the railroads to move empty cars back promptly to the producing territories or failure of the shippers to unload promptly. Both of these conditions existed in varying degrees at different times and with considerable frequency in the fall months of the year, prior to 1923. The unnecessary movement of any considerable number of loaded cars into the consuming districts, out of which districts there must always be a return empty movement due to lack of outbound loading, should be considered as inefficient utilization, and adding greatly to the problem of increasing the productive work of the equipment. If we have inefficient car distribution we have car shortages that may be entirely chargeable to failure to utilize equipment properly and not to any lack of ownership.

The Box Car Problem

In the Western district, which includes all territory west of the Mississippi river and north of the Illinois state line, the population is 17 to the square mile. The population of the Southern district is 51 to the square mile. These two territories produce from 78 to 96 per cent of our agricultural products. The population east of the Mississippi river, including the New England territory, is 158 to the square mile. It is obvious, therefore, that the agricultural products of the west and south must be marketed largely in the eastern consuming territory. The east, on the other hand, produces approximately 70 per cent of the manufactures of the country. The portion of the manufactured products which moves to the west and south is of insufficient volume to provide loading for all the box cars that must go back to the agricultural territory. There is practically no return loading for the refrigerator car. Unless the relocation of cars is maintained constantly and in sufficient volume, a box car shortage would soon occur in the west and south. Unless a constant flow of equipment is maintained to the originating lines in the territories of production, a coal car shortage will develop almost immediately.

From this situation, one fact can be readily seen. Every car that moves into eastern territory unnecessarily because of under-loading imposes upon the railroads not only the burden of the extra loaded mileage, but also additional and unnecessary empty mileage in the return of that equipment.

Therefore the question of the adequacy of equipment is tied up with its prompt movement by the railroads and the efficiency with which it is utilized by shippers and receivers. Cars, moving empty unnecessarily, whether due to inefficient handling on the part of the railroad or to more cars being used by shippers than are absolutely necessary to handle a given tonnage, cause extra expense in transportation. It is the responsibility of the railroads to correct and eliminate, in every way possible, empty car mileage owing to causes other than that controlled by definite traffic movements, but we must necessarily look to the shippers and receivers for possible improvement in the utilization of equipment to more nearly its carrying capacity.

The Present Situation

The constant aim of the railroads is to handle more business with less units of equipment, in order to reduce the overhead costs, owing to the maintenance of large surpluses resulting from seasonal declines in business and the cost of capital tied up in such equipment. The following figures give the maximum and minimum of surplus, 1923 to 1928 inclusive, for cars and locomotives:

	Maximum		Minimum	
Year	Date	Cars	Date	Cars
1923	Dec. 31	312,338	April 23	11,062
1924	June 15	362,961	Oct. 23	94,153
1925	Mar. 31	344,959	Nov. 8	103,969
1926	Jan. 8	310,155	Oct. 23	79,016
1927	Dec. 31	464,005	Sept. 30	135,059
1928	Jan. 8	461,669	Oct. 15	85,825

	Maximum		Minimum	
Year	Date	Locomotives	Date	Locomotives
1923	Dec. 15	3,992	Jan. 15	555
1924	Aug. 1	7,152	Mar. 1	3,800
1925	May 1	6,697	Feb. 15	4,208
1926	June 15	5,978	Nov. 15	3,841
1927	Dec. 15	6,754	Jan. 15	4,600
1928	Jan. 1	7,490	Nov. 1	4,958

Records indicate that, since January 1, 1923, the Class I railroads and railroad-owned refrigerator lines have placed in service 13,760 locomotives and 718,929 freight cars, of which 58,679 were refrigerators. Ownership of Class I roads freight equipment exclusive of refrigerators has decreased 70,354 cars since the high ownership period of September 1, 1925, while refrigerator ownership, including cars of railroad-controlled private car lines, have increased 35,586 cars since January 1, 1923.

Locomotive ownership has decreased 6,162 locomotives under the high ownership period of November, 1924, while the average tractive power has increased 3,847 lb. per locomotive or 9.7 per cent over November, 1924, and the average carrying capacity of freight cars has increased 1.26 tons per car or 2.8 per cent over the high period of September 1, 1925.

The following table shows the miles per car per day, 1923 to 1928, inclusive:

		Miles per Car Per Day	% Increase Over 1923
	1923	27.8	...
	1924	26.8	3.6 (decrease)
	1925	28.5	2.5
	1926	30.4	9.4
	1927	30.3	9.0
10 months	1928	31.2	12.2

*From an address delivered before the Western Railway Club at Chicago, on February 18.

This calculation includes all cars, regardless of whether surplus, awaiting repairs or while in the hands of shippers and receivers for loading or unloading.

A more representative figure as to the movement of cars while in trains, extended to a 24-hr day basis, is indicated by the following:

Miles per car per day in trains					
1928	Year				
10 Mos.	1927	1926	1925	1924	1923
307.2	295.2	285.6	283.2	276.0	261.6

Increase 1928 over 1923: 48.0 or 17.4%

Heavier Loading

Heavier loading presents the greatest opportunity for future increase in efficiency in the use of equipment. A great deal of work along this line is being done by shippers and receivers, the railroads and the car service division. We have detailed information as to some wonderful progress that has been made, but we also have other evidence which indicates that the surface has barely been scratched, so far as heavier loading per car is concerned.

Regardless of the fact that this is primarily a shippers' and receivers' problem, the railroads cannot escape their responsibility for:

(a) Loading equipment to more nearly its full carrying capacity where loading is under their jurisdiction, either at freight houses or with import freight;

(b) Ordering materials for their own use in full carload instead of minimum quantities, whenever practicable; and

(c) Keeping the situation constantly before the public in an intelligent manner. What we mean by intelligent manner is by direct personal contact of the proper representative of the railroad with shippers and receivers, pointing out to them the advantages to themselves, as well as to the railroads, in heavier loading.

We believe, therefore, that the best results can only be obtained where each railroad has an organization that is specifically charged with the responsibility of carrying on the campaign.

Several railroad officers with whom we have talked appear to be afraid of the bugaboo of shipper resentment arising from solicitation to load equipment heavier, with the possibility of a loss of traffic to some railroad less energetic in carrying on the heavier loading campaign. Our experiences indicate that there is absolutely no foundation for any such fears on the part of a railroad officer. Shippers and receivers have welcomed, from car service division representatives, explanations and solicitations for greater effort on their part and we have yet to meet the first shipper who offers any objections to the plan.

Based on the theory that the revenue on every additional pound of freight up to a reasonable limit, loaded into a car over and above its previous loading in net to the railroads, we believe it would mean $100,000,000 per year increase in net revenue for the carriers as a whole if the average load per car were increased by 2,000 lb. This theoretical conclusion can be justified in a great many ways; certainly any additional cost that might be chargeable to the handling of the additional ton is offset many times by the savings resulting from the decrease in loaded and empty mileage, switching, etc.

Relative Car Capacity

In connection with this heavier loading campaign, the question has been raised by railroad people and shippers as to the desirability from all standpoints of the construction of the 100,000 capacity box car instead of the 60,000 and 70,000 capacity cars which were considered large cars a few years ago. That, of course, is a question for determination by the individual railroads as to the traffic necessities on their lines, but we give below some figures which we believe prove conclusively that the 100,000 lb. capacity box car is the most economical car today:

1. Recently we made a check of export grain loading from Buffalo to North Atlantic ports. A total of 5,500 cars were checked, moving over five different railroads. The average revenue per car on one railroad was more than $30 higher than any of the others, because this road owned more 100,000 capacity cars than the others.

2. One of the large railroads serving the winter wheat belt gave us some figures on their loadings. This showed up as follows: 138 cars of 100,000 lb. capacity carried an average of 117,195 lb. of wheat, earning an average of $248 per car. From the same points and to the same destination, 138 cars of 80,000 lb. capacity carried an average of 89,709 lb. to the car, earning $190 per car; 94 cars of 70,000 lb. capacity carried an average of 75,217 lb., earning $158. Here is a spread of $58 per car between the 100,000 lb. and 80,000 lb. cars, and a spread of $89 per car between the 100,000 and 70,000 lb. capacity cars.

Again, 46 cars of 100,000 lb. capacity carried an average of 113,217 lb. of cement earning an average of $124 per car. From the same points to the same destination, 46 cars of 80,000 lb. capacity carried an average of 63,484 lb. to the car earning $69 per car; 21 cars of 70,000 lb. capacity carried an average of 54,669 lb. to the car, earning an average revenue of $62. Here is a spread of $54 between the 100,000 and 80,000 lb. capacity cars and a spread of $61 between the 100,000 and 70,000 lb. capacity cars.

3. Last July the shipments of wheat in the southwest were the heaviest on record. The railroads and shippers' advisory boards came in for much commendation when this movement was handled without car shortage and without congestion in the markets. Analyzing the car ownership of the four principal roads serving this section, we find that 58 per cent of their box cars are of the 80,000 lb. capacity type and 29 per cent of the 100,000 lb. type. If they had had nothing but cars of 60,000 capacity, it would have required an increase of 46 per cent in the number of cars in service. What such an increase in equipment would have meant in the way of reduced efficiency in train service, congestion and blocking of the country elevators, accumulation and congestion at primary markets and terminals, and increased expense to the railroads for the maintenance and handling of these additional cars, can be left to the imagination. Unquestionably, such a condition would have resulted in a paralysis of transportation, not only in the southwest, but throughout the entire country, exceeding any of the disastrous car shortages of the past. On the other hand, if these railroads had had nothing but 100,000 lb. capacity cars, they could have handled the same business with 25 per cent less car units than they actually did.

We believe it would be desirable to add to what has been said, the following extract from a letter recently received from the general superintendent of transportation of a railroad which has dealt quite extensively with this question of the relative merits of the various sizes of cars:

GRAIN LOADING

Capacity of Cars Used	Bushels of Grain Loaded During Year	Number of Cars Required	If Capacity of Cars Used Had Been	The Number of Cars Required to Handle the Grain Would Have Been	A Saving in
80,000 lb.	35,757,170	23,157	100,000 lb.	17,878	Cars of 5,279 or 23%

Average Light Weight 80,000-lb. Capacity Box Cars	Carrying Capacity Bushels	Average Light Weight 100,000-lb. Capacity Steel Box Car	Carrying Capacity Bushels	If 100,000-lb. Capacity Cars Had Been Used Would Have Saved
43,000 lb.	1,550	46,700 lb.	2,000	108 Trains and $170,586 based on Average Train Costs

Total Cars Saved If 100,000-lb. Capacity Cars Had Been Used in Grain Loading	Switching Charges Per Car	Total Saving Switching	Saving In Cooperage	Grand Total Saving In Grain Handling If 100,000-lb. Capacity Cars Had Been Used in Place of 80,000-lb. Cars
5,279	$4.50	$23,755.50	$26,395	$220,736.50

COAL LOADING

Approximate Tons of Coal Loaded During Year	Approximate Tons of This Coal Loaded in 60,000-lb. and 65,000-lb. Capacity Coal Cars	Cars Required To Handle Coal	If 140,000-lb. Capacity Cars Had Been Used It Would Only Have Required	Saving In Cars Of	Saving In Trains Loaded and Empty	Saving In Train Service Expense
12,000,000	1,430,000	44,687	17,875 Cars	26,812	517	$349,909

About one million loads are handled yearly by this road. Increasing the tons per car one ton would mean a saving of approximately 40,000 to 45,000 cars or about 400 short and long haul trains per year and half a million dollars in train service alone.

Despite the equipment rehabilitation program during the past six years the railroads still own 282,556 box cars of 60,000-lb. capacity type. We believe that with the retirement of such of this equipment as does not measure up to present day construction standards, the number of units required to handle the traffic of the country can be greatly reduced, thereby adding further to economical operation.

Hog Mortality in Hot Weather

By E. F. Ford
Transportation Inspector, Chicago, Burlington & Quincy

ONE of the large items in the freight claim account is for hogs that are found dead at the live stock markets during the spring and summer. These hogs check out from one to ten dead per car, and in one known instance, 22 in a single car. The hogs have died under mysterious circumstances and the claims for them are charged usually to either "unlocated loss" or "failure to drench." It fell to my lot last summer to make a study of the subject and some of the claim agents among the readers of the *Railway Age* may be interested in what was learned.

We have always been taught that it would be dangerous, if not fatal, to drench hogs when they are hot, either on their backs, shoulders, heads or sides; and that they should be drenched on their bellies. Since the average hog rides on his belly in the car it is impracticable to reverse this position (so the water will strike his belly first) and it would be impossible to miss the head, shoulders or sides even though every hog were on his back. Having a strong suspicion that this so-called danger to hot hogs was all wrong, the drenching received particular attention on the test trip made.

July 2nd of last year was selected for the trip, it being the hottest day of the summer up to that time, with the temperature well up into the nineties. Train 68 was ridden from Brookfield, Mo., to National Stock Yards, East St. Louis, via Hannibal, Mo. At Hannibal it was consolidated with the regular through live stock train. Between Brookfield and Hannibal we picked up 16 cars of hogs and at Hannibal 15 more. The hogs were given good heavy drenching as follows: At Brookfield at 11 a. m.; Kern 2:25 p. m.; Lakenan 5:35 p. m.; Hannibal 10:05 p. m. Then at 3:20 the next morning at Old Monroe and a final drenching as they passed the stock yard unloading dock at 6 a. m. Practically all of the water thrown in the drenching of these hogs struck them on the head, shoulders, backs, etc.; very little struck them on their bellies except when they rolled around in the puddles.

In these 31 carloads of hogs there was a total of 1931 live head, and we checked out 1931 live hogs upon unloading. One hog walked out of the car very groggy and had to be helped into the pen, where he was found dead when checked up five minutes later. Checking up further on this one animal it was found to have come out of a car loaded at Clarence, Mo. When this car was loaded at Clarence, the day before, it was noted that the hogs were very hot, having been just driven in, and when they were rounded up to be loaded one of them failed to get up. He was dead in the pen—clearly knocked out by the heat and the driving from the farm. It is logical to assume that the hog that died after unloading at the stock yards was from this same car and was knocked out by the same combination, but happened to have enough resistance to stand the trip to market. All of these hogs were hot when they were drenched—they were panting hot; and this test trip proves not only the utter fallacy of the theory that it is dangerous to drench them when hot anywhere except on their bellies, but it also shows that they go through in good shape even great distances, during record heat of summer weather, when they are properly drenched.

Our research in the question of hog mortality during summer months, led us to canvass the railroad for the ideal shipper—the man who ships large lots of hogs and who never has any of these mysterious dead ones. We found him in Laclede, Mo., and his name is R. T. Patterson. He is manager for the local Farmers' Shipping Association and vice-president of a local bank. During eight years and five months beginning January 1, 1919, he shipped a total of 835 cars, containing a total of 48,558 hogs and the only dead hog figuring in the movement was *one;* this during a blizzard, when it took three engines to get the train to Kansas City. He simply does not have any of this mysterious mortality during the summer. And here is how he avoids it:

Instead of following the popular custom and leaving his hogs out in the pens until the stock pick-up train is whistling for town, and then loading them up in a hurry, he loads them into the cars from two to five hours before the train will be there and drenches them occasionally within the cars, so that by the time they are picked up they are cooled off and are settled down contented for the trip.

The only hog that died in the 31 cars in the test trip came out of a car that had been loaded at the last minute, and loaded in a hurry, with the train waiting. It is quite clear, as I see it, if the leisurely loading method of this man at Laclede were adopted at all hog loading stations, and the hogs were wet down occasionally within the car after being loaded, they would be put in good shape to stand delays on the road. Have we not here a pointer to a sizable reduction in the animal freight claim bill?

STUDENTS to the number of 309, in 46 colleges and universities along the Illinois Central, submitted essays in this road's contest on "The Future of the Railroads," which closed on February 28. A prize of $25 is offered for the best essay in each institution and $100 for the best in the entire contest.

Compulsory Construction of Oregon Line Recommended

WASHINGTON, D. C.

A RECOMMENDATION that the Interstate Commerce Commission require the Oregon-Washington Railroad & Navigation Company to build a rail line extension across the "high desert" of the central part of Oregon, from Crane to a connection with the Southern Pacific at or near Crescent Lake, approximately 185 miles, is made by Commissioner Frank McManamy in a proposed report on the complaint filed by the Public Service Commission of Oregon, which had asked that one or more of the carriers serving the state be required to build such a line.

This recommendation is based on a proposed finding that the extension is reasonably required in the interest of public convenience and necessity and that the expense involved, estimated at $9,000,000 by the complainant and at $11,717,677 by the O.-W. R. & N., will not impair the ability of the carrier to perform its duty to the public. The defendant railroads had taken the position that there is no public necessity, interest or convenience to be served by the requested construction, and that if the law can be construed as conferring upon the commission authority to require the construction and operation of the proposed extension such provisions are unconstitutional. The O.-W. R. & N. had contended that the entire proposition of building a line across central Oregon to a connection with the Southern Pacific is economically unsound; that the nature and resources of the territory are such as to prohibit development of sufficient traffic to sustain the line; that existing rail facilities are ample to properly take care of all needs of eastern and western Oregon and of southwestern Idaho; and that the Southern Pacific cannot be expected to divert traffic to the cross-state line and thereby short-haul itself.

A line across the state has long been urged by the Oregon people and the area involved is described in the report as probably constituting the largest within the United States without rail facilities, including a county approximately as large as the state of Massachusetts. In 1905 the state legislature passed a bill contemplating the construction of a similar line by the state, after which some preliminary steps toward construction were taken by both the Hill and the Harriman lines. The issues were considered by the commission in a report issued in 1926 on applications filed by carriers for certificates dealing with other construction and arrangements in this territory, when the Oregon commission asked that the cross-state line be required, but the commission then held that the record before it was not sufficient.

Commissioner McManamy says the commission should find that authority has been vested in it to authorize or require the construction prayed for if the conditions set out in the statute are satisfied and the facts otherwise warrant the construction. Two conditions must be satisfied, he said, before the issuance of an order; (1) that the extension is reasonably required in the interest of public convenience and necessity, and (2) that the expense involved will not impair the ability of the carrier or carriers involved to perform their duty to the public. He also declared that the requisites set forth in the statute are practically identical whether the construction is to be voluntary or compulsory.

Following are some extracts from the report:

It is urged that Oregon's development, as compared with other states, has been held back and seriously hampered due to the lack of direct routes to the markets for her products and that the construction of the proposed extension is an important part of anticipated development of adequate rail transportation facilities within the state. The evidence of complainant and defendants brings out clearly and forcibly that no section can develop without transportation. The major portion of the State of Oregon is without adequate transportation facilities and this is particularly true with respect to the portion which would be served by the proposed construction. The Oregon Commission points to the fact that the proposed construction is not a new idea, but would in reality be a partial completion of a program of rail construction started by the Union Pacific Lines many years ago. It is sufficient to say that the location of the extension as proposed by the Oregon Commission follows the original survey of the Union Pacific and would connect what is now in effect a branch line from Ontario to Burns, Oregon, with the so-called Natron cut-off of the Southern Pacific which is what was contemplated when the construction was first extended west from Ontario. The proposed line would leave the present Ontario-Burns branch of the O.-W. R. & N. at Lawen, near Crane, and extend westward to a point on the Cascade line of the Southern Pacific at or near Crescent Lake, a distance of approximately 185 miles. The proposed extension would cross, approximately 21 miles east of Crescent Lake, the recently constructed line of the Great Northern running from Bend to a connection with the Southern Pacific at Chemult.

The matter of establishing through routes and joint rates from western Oregon to the east via the proposed extension can not properly be disposed of except upon an adequate record dealing with all the facts relating thereto. The commission could hardly require the establishment of through routes and joint rates at this time because the line is not yet in existence. It does seem reasonable to assume that a substantial volume of western Oregon traffic will move to the east via the proposed line when consideration is given to the shortened mileage and the savings which it is shown can be brought about in transportation costs through the use of this route. After careful consideration of complainant and interveners traffic and revenue estimates and of defendants' criticisms thereof, we are firm in the belief that the extension would be a valuable asset to the Union Pacific System and would be an effective feeder for that system after a reasonable development period. At the same time the construction would bring about development in a vast territory. It would be of material benefit to the present Ontario-Burns branch.

It is not necessary in establishing that the extension is reasonably required in the interest of public convenience and necessity to show that the extension would of itself, and considered as standing alone, earn sufficient revenues to make it a paying proposition. The relation of the extension to the Union Pacific System and its possibilities as a developer of traffic for that system must be considered. The commission has recognized this principle in many cases.

The convenience and necessity of the public depends not at all upon the willingness or unwillingness of the carriers to provide the facilities or render the service sought. The requisites set forth in the statute are practically identical whether the construction is to be voluntary or compulsory. Case after case might be cited where applications of the carriers for certificates covering construction under less favorable circumstances, as related to probable traffic, revenues, and public benefit, than are present in this case have been granted. There can be no justification for granting requests of the carriers under given circumstances and under similar or more favorable circumstances denying appeals of the people for relief and for a reasonable chance to develop a great State. There can be no better criterion or guide to follow in determining what the carriers, including defendant carriers, and the commission consider a prudent investment which is justified in the interest of public convenience and necessity than the instances where certificates have been sought and granted authorizing construction of rail extensions.

The commission should enter an appropriate order requiring the Oregon-Washington Railroad & Navigation Company to construct the extension substantially as proposed by complainant and authorizing the Union Pacific and the Oregon Short Line to participate therein.

As previously shown the O.-W. R. & N. is owned by the Oregon Short Line which, in turn, is owned by the Union Pacific. All eastbound traffic moving from and over this exsion will move practically the full length of the latter carriers. Under such circumstances it would be inconsistent and contrary to fairness to consider the new construction with relation only to the O.-W. R. & N. and apart from the Oregon Short Line and the Union Pacific. In view of these facts, it is expected that the cost of the construction will be financed by the Union Pacific in a manner similar to that which it voluntarily followed in the construction of the Burns extension previously referred to.

Trunk Lines Ordered to Dispose of W. & L. E. Stock

Commission Finds Control May Lessen Competition

WASHINGTON, D. C.

WITH Commissioners Woodlock, Brainerd, Porter and Farrell dissenting, the Interstate Commerce Commission has held that the Baltimore & Ohio, New York Central and New York, Chicago & St. Louis have violated Section 7 of the Clayton anti-trust act by their acquisition, early in 1927, of 17 per cent each of the capital stock of the Wheeling & Lake Erie, and has ordered the three companies to divest themselves of the stock so acquired within 90 days. The decision was dated March 11 and made public on March 13, only a few days after the commission had been informed that the Baltimore & New York Central had arranged to dispose of their stock in the Wheeling to the Allegheny Corporation, a holding company controlled by O. P. and M. J. Van Sweringen, which would hold two-thirds of the stock of the Wheeling company while the Nickel Plate is required to dispose of its third.

The report states that informal representations had recently been made to the chairman of the commission to the effect that the B. & O. and Central had disposed of or were in process of disposing of the Wheeling stock owned by them, but that, "of course, such representations can have no weight in this proceeding which is necessarily determined on the record formally before us."

The majority of the commission finds that the effect of the acquisitions of stock of the Wheeling by the three companies "may be to substantially lessen competition between the Wheeling and each of the corporations so acquiring its stock, and to restrain the commerce of the Wheeling; and that such acquisitions were therefore in violation of Section 7 of said act."

The dissenting commissioners take the position that the majority have given the Clayton act a narrow construction and that the purchases of stock were not made for the purpose of and have not had the effect of lessening competition. Commissioner Woodlock remarked that "we must assume that Congress expected us to use at least some common sense."

The commission had previously denied applications filed on behalf of officers and directors of the three trunk lines for authority to serve also as directors of the Wheeling company, after which it issued complaints against the three companies charging violation of the Clayton law.

After its analysis of the evidence presented at the hearings the commission's report continues:

Conclusions of the Majority

It appears that the respondents acquired a controlling portion of the stock of the Wheeling as a step in furtherance of their plan to acquire all of its stock eventually, and to make the line of the Wheeling a jointly-owned facility to be used in connection with three of the systems in a four-system division of the eastern carriers which the respondents hoped to bring about, with our approval. The four-system plan had been brought informally to the attention of some of our members. As explained by the respondents, the Wheeling was to perform functions analogous to those of a belt line, jointly controlled but operated by a separate corporation. Why it is necessary to obtain control of the Wheeling in order to make such use of its facilities is not clear. Accepting this explanation, it seems necessary to conclude that the value of the Wheeling as a competitive factor in the territory it serves, and in the territories which it aids other carriers in serving, would be greately impaired. As we have already said, the amount of traffic which might possibly be diverted from the Wheeling to the lines of the respondents falls far short of being the true measure of the value of the Wheeling as a competing line; and it is not improbable that the presence of the Wheeling in this field, offering its facilities and diligently seeking traffic in competition with the respondents is a factor of greater value to the shipping public than the transportation service it performs. We are unable to accept the theory that competition of the Wheeling with the respondents might continue unimpaired pending the final assignment of the Wheeling in a consolidation of eastern lines. The knowledge of its relationship to its controlling lines would deprive it of force as a competitor for their traffic. The fact that no adverse effects of the acquisitions of stock by respondents have yet appeared is not an indication of ultimate effects, should the present stock ownership continue.

At the time of the purchases of Wheeling stock by the defendants, and for some time prior thereto, it was well known that control of the Wheeling, or at least an interest therein was earnestly sought by the Pittsburgh & West Virginia in protection of its preferred through route between the Pittsburgh District and the west, and in furtherance of its plans to form a part of a through route between east and mid-west, in which the use of the line of the Western Maryland was involved. The feasibility of such a route was discussed in our report in *Consolidation of Railroads*, 63 I. C. C. 455, issued August 31, 1921. At about the time of the respondents' purchases of Wheeling stock, the Pittsburgh & West Virginia also succeeded in acquiring about 11 per cent of the stock. The circumstances raise a strong presumption that the respondents, and especially the Baltimore & Ohio, were actuated, at least in part, by a desire to secure control of the Wheeling in order to prevent the consummation of the plans for a competing through system, to which the geographical position of the Wheeling lends itself. These plans are directly opposed to those of respondents.

As a result of our consideration of the evidence before us and of the true construction of the statute, it is necessary to conclude that with the acquisition of a majority of the voting stock of the Wheeling, the substantial lessening of competition between the Wheeling and the respondents was not merely probable but was in fact accomplished. Assuming that it would be possible for a controlling carrier or carriers to provide such routing of traffic, service, and rates for a controlled carrier as to enable it to maintain or even to increase its volume of business, such a result would not be due to competition, which necessarily ceases with the acquisition of control. An appearance of strife for traffic might even be continued, but it would not be the competition meant by the statute. We find it impossible to accept the theory that Congress intended that acquisition of absolute control of one corporation engaged in commerce by one or more other corporations engaged in like commerce in the same territory could be regarded otherwise than as a substantial lessening of competition. To require us to rely upon declarations of intention, counter influences or other hypotheses as evidence that acquisition of control by one competitor of another would not have its usual and natural effect, would be to establish an unworkable rule necessarily resulting in ineffective administration of the law. Although the control in this instance can not be regarded as lawfully existent without our approval, the ownership of stock, looking to such lawful control, is sufficient to negative any theory of real independence of action in matters in which the parties

should normally be opposed. A community of interest among the respondents in their acquisitions of Wheeling stock is evident. Without passing upon the legality of their concert of action—a question not here in issue—it is necessary to conclude that the acquisitions by each of them, under the circumstances here disclosed, may have the effect of substantially lessening competition between their lines and the Wheeling.

We are not advised of any judicial interpretation of the expression "restrain such commerce," as used in section 7 of the Clayton Act, when applied to the commerce of railway companies. It is perhaps more applicable to relationships between industrial or commercial corporations. However, it seems reasonably clear that control of the Wheeling by other carriers engaged, for example, in the transportation of coal which competes with coal produced on the line of the Wheeling may result in restraint of commerce in that commodity from its producing territory.

Dissenting Opinions

Commissioner Woodlock's dissenting opinion follows:

The sole question here is whether the ownership by the respondents of stock in the Wheeling Company constitutes a violation of the Clayton Anti-Trust Act. These respondents allege that the stock was acquired by them solely as an "investment" in furtherance of the so-called "Four-party plan" of grouping the railroads in eastern territory and that as such the ownership is covered and legitimized by the third paragraph of section 7 of the act. It is not even charged, much less shown, that they or any of them have committed any overt acts looking to lessening the Wheeling's competition with themselves. The record shows that they have, since the acquisition of Wheeling stock, pursued a policy of inertia about as complete as could practically have been followed in the circumstances so far as interference with, influence over or control of the Wheeling's actions are concerned. This, it seems to me, fully substantiates their claim that the Wheeling stock was purchased "solely for investment," as contemplated in the third paragraph of section 7. A reason for that investment was shown, and all the actions of the respondents disclosed of record—and otherwise—are consistent with that claim,

It seems to me that in dealing with the Clayton Act as affecting this and kindred questions arising under sections 5 of the Transportation Act we must assume that Congress expected us to use at least some common sense. We must also assume that Congress itself, when legislating, was aware of existing facts and the implications necessarily existing in those facts. Among those facts was the stock market with its inevitable concomitant stock speculation. Forestalling is the essence of speculation. Can it be supposed that, when Congress provided under section 5 (2) that a railroad might, with our approval, purchase the stock of another, it intended that our approval should in all cases first be asked and, after public hearings over a considerable period of time, granted, before any purchase were actually made? So to suppose is to attribute to Congress ignorance of the obvious in a preposterous degree. The common sense hypothesis is that it contemplated among other things the precise state of affairs that we have here, and that it found in the provisions of the Clayton Act as they stood and stand an effective method of giving effect to section 5 (2) of the Transportation Act, and therefore did not feel compelled to legislate in a special manner with respect thereto. Nor is even a meticulously technical adherence to the letter of the Clayton Act inconsistent with this hypothesis. In the circumstances we are not merely warranted but, I think, are bound by our reason to adopt it.

Commissioner Porter, after referring to the pending applications of the Chesapeake & Ohio and Baltimore & Ohio for approval by the commission of their proposed systems, which show, he said, that the Baltimore & Ohio does not desire to retain its interest in the Wheeling and that the C. & O. has asked that the Wheeling and the Nickel Plate be placed in the same system. He also refers to the possibility that the commission, after requiring the Nickel Plate to dispose of its stock, may later authorize it to acquire control of the Wheeling. Commissioner Farrell concurred in Commissioner Porter's opinion, which concludes as follows:

In my judgment these purchases having obviously been made, not for the purpose of lessening competition, but to hold this important carrier, Wheeling & Lake Erie, in status quo until this Commission shall have determined where it shall ultimately be allocated, the very most we should do would be to postpone our determination of this matter until after we have passed on the applications referred to now before us, and which determination will go largely towards solving the question of consolidation in the important region of the east. The Clayton act may well be an important and effective instrument in our hands to bring about obedience to our wishes in consolidation of the rail carriers as finally determined by us, but its ruthless use as is here proposed by the majority can not be justified.

Commissioner Brainerd also wrote a separate dissenting opinion and Commissioner Eastman a concurring opinion.

Report on Charfield (England) Collision

THE British government desires eventually to see automatic train control adopted on all high-speed passenger railroads; and where this safeguard is not provided, to have all important trains made up with one or more steel baggage cars at the front and rear ends. It is also desired that weak cars shall be placed in the centers of trains and that on all except unimportant branch line trains the coaches shall be electrically lighted. This statement may be made with confidence, and with a fair degree of accuracy, for it is based on the recommendations of Colonel J. W. Pringle, the veteran chief inspecting officer of the Ministry of Transport, in his report on the collision of October 13 last at Charfield, on the London, Midland & Scottish Railway, when 16 passengers were killed and 41 passengers, mail clerks and trainmen were injured. The collision was followed by a furious fire.

The views stated in these accident reports, as published by the Ministry of Transport (as in former years by the Board of Trade), are to be taken as virtually the voice of the government, for it is only by this means that the pressure of governmental opinion is brought to bear on the railway companies. In matters of safety, actual and direct legislative action usually comes only after the main question has been settled by this semi-formal publicity.

Colonel Pringle does not recommend anything more definite than this, contenting himself with observing that the subject of automatic train control is in the hands of a committee now sitting. A committee, of which Colonel Pringle was chairman, reported in April, 1922, that "a case had been made out" for the installation of automatic train control on British railways, but the cost (for the whole country) was estimated at over $23,000,000 and the report was of such a generally cautious nature that its only visible result, so far, has been the appointment of this later committee, which is now sitting.

This collision is the worst train accident that has happened on a British railway since December 1915, and the inspector remarks on the element of chance which so often seems to be the deciding factor in a train accident. Ten seconds after this collision occurred, there would have been no obstruction in the path of the passenger train. Of the two freight trains which were involved, one had to stop to take water; if the signalman had known that this stop would be necessary, he would have made different movements, which would have averted the collision. Factors which made this collision specially disastrous were the simultaneous movement of two northbound freight trains alongside the southbound track, traversed by the passenger train, and the presence of bridge abutments on each side of

the roadway interfered with the efforts to subdue the fire.

The passenger train, a southbound mail, moving at high speed at 5:20 a.m., ran past a distant and two home signals set against it and struck a freight train which was moving from the main line to a side track. Two locomotives and tenders were overturned and became wedged under the overhead bridge and seven or more passenger cars were piled up and destroyed by fire. The inspector examined 39 witnesses. The engineman claimed that he saw a green light approaching the distant signal and the fireman corroborated him, but the inspector cannot accept their testimony. Never before when running this train had this engineman been stopped at Charfield, and he was not expecting to be stopped this morning. He is recorded as a man of good character and his record shows no entry of his having previously disregarded a signal set against him.

The fireman was "not a reliable observer."

In his recapitulation at the end of the report, the inspector discusses the question of making coaches collision-proof but he says the preferable policy is to prevent the collisions.

Census of Railroad Cars

ACCORDING to data collected at the biennial census of manufactures taken by the Department of Commerce in 1928, the establishments (other than railroad repair shops) engaged primarily in the manufacture, rebuilding, and repair of railroad cars in 1927 built 61,766 steam and electric cars, valued at $205,144,809. These figures represent decreases of 37 per cent in number and 23.1 per cent in value as compared with 97,966 cars, valued at $266,629,968, built in 1925, the last preceding census year. The output in 1927 was made up as follows: 1,965 steam-railroad cars for passenger train service (including baggage, express, and mail cars), valued at $52,379,918; 58,509 steam-railroad cars for freight service, $133,006,798; 1,143 electric-railroad passenger cars, $18,105,781; 149 electric-railroad freight, express, and mail cars, $1,652,312, car parts and miscellaneous products, $53,104,458; value of repair work, $54,259,331. The total value of products for 1927 amounted to $312,508,598, representing a decrease of 20 per cent as compared with the corresponding total for 1925, $390,771,210.

The above figures do not include data for cars produced in railroad repair shops and by a few establishments engaged primarily in other lines of manufacture. The production in railroad repair shops in 1927 was as follows: Steam-railroad repair shops—354 cars for passenger train service, valued at $1,625,012; 10,004 cars for freight service, valued at $19,440,260; 201 cars for service other than freight or passenger, $535,390. Electric-railroad repair shops—83 cars for passenger service, valued at $811,844; 18 cars for service other than passenger, valued at $101,768. The small production of cars built incidentally in 1927 by establishments engaged primarily in other industries can not be given in this report, but will be shown in the final report for the car-building industry.

The statistics for 1927 and 1925 are summarized in the accompanying tables, (figures for 1927 subject to correction).

The second and third items in Table No. 1 do not include salaried employees. The amount of manufacturers' profits cannot be calculated from the census figures, for the reason that no data are collected in regard to a number of items of expense, such as interest on investment, rent, depreciation, taxes, insurance, and advertising.

Table I—Summary for 1927 and 1925

	1927	1925	Per cent of decrease
Number of establishments	135	141	4.3
Wage earners (average for the year)	38,031	50,393	24.5
Wages	$60,624,856	$77,246,992	21.5
Cost of materials, shop supplies, fuel, and purchased power, total	$209,112,561	$266,053,504	21.4
Materials and supplies	$204,440,378	.....	...
Fuel and power	$4,672,183	.....	...
Products, total value	$312,508,598	$390,771,210	20.0
Railroad cars, value	$205,144,809	$266,629,968	23.1
Other products, value, and receipts for repair work	$107,363,789	$124,141,242	13.5
Value added by manufacture	$103,396,037	$124,717,706	17.1
Horsepower	236,415	243,934	3.1

Table 2.—Cars Built, Number and Value: 1927 and 1925

	1927	1925	Per cent of increase or decrease (—)
Aggregate value	$205,144,809	$266,629,968	—23.1
Steam-railroad cars:			
Total number	60,474	96,132	—37.1
Total value	$185,386,716	$247,180,664	—25.0
Passenger service [a]—			
Total number	1,965	2,121	— 7.4
Total value	$52,379,918	$54,940,366	— 4.7
Passenger—			
Number	974	593	64.2
Value	$22,867,336	$13,992,732	63.4
Baggage and express—			
Number	265	349	—24.1
Value	$5,202,315	$5,676,023	— 8.3
Chair, dining and buffet, mail, and sleeping—			
Number	538	1,027	—47.6
Value	$18,907,769	$32,144,217	—41.2
All other [a]—			
Number	188	152	23.7
Value	$5,402,498	$3,127,394	72.7
Freight service—			
Total number	58,509	94,011	—37.8
Total value	$133,006,798	$192,240,298	—30.8
Box—			
Number	19,645	49,230	—60.1
Value	$45,318,843	$101,023,855	—55.1
Caboose—			
Number	186	242	—23.1
Value	$717,132	$690,775	3.8
Flat—			
Number	1,656	2,306	—28.2
Value	$2,837,703	$3,225,184	—12.0
Gondola—			
Number	10,479	21,402	—51.0
Value	$20,023,065	$42,002,090	—52.3
Hopper—			
Number	8,734	3,243	169.3
Value	$19,917,603	$5,869,778	239.3
Refrigerator—			
Number	9,004	4,704	91.4
Value	$25,633,161	$14,740,724	73.9
Stock—			
Number	1,016	3,310	—69.3
Value	$1,881,862	$5,876,501	—68.0
Tank—			
Number	5,455	5,396	1.1
Value	$10,448,662	$10,701,728	— 2.4
All other [b]—			
Number	2,334	4,178	—44.1
Value	$6,228,767	$8,109,663	—23.2
Electric-railroad cars:			
Total number	1,292	1,834	—29.6
Total value	$19,758,093	$19,449,304	1.6
Passenger—			
Number	1,143	1,753	—34.8
Value	$18,105,781	$19,030,149	— 4.9
Freight, mail, and express—			
Number	50	12	....
Value	$159,750	$41,225	287.5
All other—			
Number	99*	69	.....
Value	$1,492,562*	$377,930	294.9

[a] Includes, for 1927, 141 gasoline and gasoline-electric motor cars for use by steam railroads; for 1925, 131 such cars.

[b] The chief items included are: For 1927, 1176 ballast cars, valued at $2,701,231; 345 sugar-cane cars, $393,797; 216 dump cars, $860,971; 57 milk cars, $407,340; 278 ore cars, $679,379; 200 poultry cars, $679,534; 23 snow plows, $207,125. For 1925, 456 ballast cars, valued at $912,800; 2063 sugar-cane cars, $3,270,942; 935 ore cars, $1,698,613; 160 poultry cars, $535,000.

* Includes data for 51 gasoline and gasoline-electric motor cars for use by electric railroads.

New Books

Books and Articles of Special Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Bibliography, Street and Highway Safety. Prepared for the Committee on Causes and Prevention of Highway Accidents, Highway Research Board, by the Staff of the Library of the Bureau of Public Roads. "Grade Crossing Accidents on Rural Highways," p. 35-60. "Traffic Legislation" (grade crossings), p. 245-248. "Traffic Control Signals and Signs" p. 281-288. 388 p. Distributed by Highway Education Board, Washington, D. C. *Apply.*

Commerce Train News 1928. In connection with New Zealand's first commerce train this newspaper was published bringing out the natural and recreational resources of the country, the railroad history and facilities and other data of interest. 1200 miles were covered by train, and 500 by motor car or launch. Illustrated. 46 p. Pub. by General Manager's Office, New Zealand Railways, Wellington, N. Z. *Apply.*

Farm Relief, edited by Clyde L. King. "Transportation rates and facilities" by Harry Gabriel, p. 147-150. "The Mississippi waterway" by Norman F. Titus, p. 238-290. "The St. Lawrence waterway" by G. P. Pillsbury, p. 291-295. "Recent migrations of industries in the United States" by R. H. Lansburgh, p. 296-301. The Annals for March 1929, vol. 142, no. 231. 479 p. Pub. by American Academy of Political and Social Science, Philadelphia, Penna. $2.00.

In Those Days—An Impression of Change, by Harvey Fergusson. In four parts, entitled respectively "Wagons," "Indians," "Railroad," and "Gas" the author tells the story of a man who came as a greenhorn to the southwest of the 1860s and lived through the strenuous development years to become a sort of museum piece—an old-timer who "was there before the railroad." A vigorous novel, more like a memoir, and not for those who must have their west "prettified." 267 p. Pub. by Alfred A. Knopf, New York City. $2.50.

Periodical Articles

The Export Season of 1927-28 on the Chinese Eastern Railway, by M. I. Bonner. The export season ended Sept. 30, 1928. Transportation of grain, export of cereals from North Manchuria, "a group called 'other goods' consisting of different commodities, such as haberdashery and piece goods, groceries, drugs and chemicals, porcelain, earthenware, wicker and wooden articles, cotton wool, cotton and many other goods" (p. 6), coal, firewood, construction timber and other building materials, hay, livestock, salt, and import goods are discussed. Manchuria Monitor, 1928, nos. 11-12, English section, p. 1-9.

Labor's Railroad Conference. Report of and papers at conference at Johns Hopkins University in January. "The Problems of Management" by Daniel Willard, p. 327-334. "Labor's constructive function in the railway industry," by O. S. Beyer, Jr., p. 335-342. "The Railroad employees' interest in rate regulation" by Prof. Winthrop M. Daniels, p. 342-346. "The Public interest in the railroad industry," by Frank McManamy, p. 347-352. American Federationist, March, 1929, p. 326-352.

Railroad Electrification. A thoughtful editorial. "The railroads must not only keep up, but they must compete with all comers." Commercial and Financial Chronicle, March 2, 1929, p. 1283-1284.

The Song of the Freight Cars, by Harry Kemp. "We form caravans never ceasing that shift across the land! Greater than Babylon, Baalbec, and farther than Samarcand." Saturday Evening Post, March 9, 1929, p. 66.

Looking Backward

Fifty Years Ago

During 1878 freight was carried on the Susquehanna division of the Northern Central [now part of the Pennsylvania] at an average cost to the shipper of slightly more than one-third of a cent per ton mile.—*Railway Age,* March 13, 1879.

Recent figures show that the cost of establishment of existing railways, including equipment, per mile in various states is as follows: New York, $84,194; Pennsylvania, $73,911; Ohio, $65,307; Connecticut, $34,322; Illinois, $49,579; Iowa, $33,750.—*Railway Age,* March 13, 1879.

The track laid across the Missouri river on the ice by the Northern Pacific near Bismark, Dakota, was taken up on March 11, the ice being nearly ready to break up. For two days the trains had crossed with considerable trouble, water and floating ice running over the firm ice, which was still solid enough to carry a train. The track served its purpose in enabling the railroads to transfer materials across the river for the construction of the first section of 25 miles of the westward extension.—*Railroad Gazette,* March 14, 1879.

Twenty-Five Years Ago

The Supreme Court of Illinois, in a recent decision, has fully sustained the principle of car service associations, ruling that demurrage charges are legal, that 48 hrs. free time and the charge of $1 per day are reasonable and that such regulations are in the public interest.—*Railway Age,* March 18, 1904.

An English contracting firm has been awarded the contract for building the four tunnels under the East river at New York for the Pennsylvania. The work on the North river tunnels is to be undertaken by a New York company. The two North river tunnels will be 6,000 ft. long, each tube will be constructed of cast iron and their greatest distance below the river bed will be 92 ft.—*Railway and Engineering Review,* March 19, 1904.

The United States Supreme Court at Washington, D. C., on March 14, handed down a decision in which it affirmed the decree of the circuit court at Minneapolis, Minn., declaring the Northern Securities Company illegal under the provisions of the Anti-Trust act of 1890. The supreme court holds that the Northern Securities Company destroys every motive for competition between the Northern Pacific and the Great Northern. In reaching its decision the court stood five to four.—*Railway Age,* March 18, 1904.

Ten Years Ago

The Pennsylvania has recently completed and placed in service the Pennsylvania Hotel in New York, which has 2,200 rooms, making it the largest hotel in the world.—*Railway Review,* March 15, 1919.

George Stephen, freight traffic manager of the Canadian Northern at Winnipeg, Man., has been appointed freight traffic manager of the Canadian National, with headquarters at Toronto, Ont.—*Railway Age,* March 14, 1919.

The Grand Trunk Pacific [now part of the Canadian National] has apparently been put into the hands of a receiver, without having defaulted on its outstanding obligations. The interest due on March 1 was paid, but on March 6 the vice-president of the railroad notified the acting premier of Canada that the company would, owing to lack of funds, have to discontinue operation after March 10. An application for a receiver in the ordinary way could not be made, but acting under the War Measures act orders in council were passed appointing the Minister of Railways as receiver.—*Railway Age,* March 14, 1919.

Odds and Ends of Railroading

A Weighty Problem

Who is the largest engineman in the country? W. G. Gray, of the Pennsylvania, enters his 370 pounds as a claimant for the title. He and his fellow-committeeman, Otto Dahlke, 270 pounds, also claim the double championship.

Over the Chief Inspector's Phone

"This is the purchasing agent of the Crooked Creek. Our boilermaker wants the chief to tell him how much material will be required for a petticoat pipe in No. 3 engine."

Chief's New Stenographer—"Well, the chief is out of town today, but if your wise-cracking boilermaker has an engine that insists on wearing a petticoat you tell him to take it around to an old-fashioned dressmaker."—The Locomotive.

Wins French War Medal

John W. Davis, signal maintainer in the telegraph and signal department of the Wilmington division of the Pennsylvania, has been cited for bravery by the French Government for his services in the defence of Verdun while a sergeant, first class, Battery "B," 115th Field Artillery. He is now captain of the service battery, 198th Anti-Aircraft Regiment of the coast artillery. The medal was received from the French Government on December 27.

Call Boy—Jockey

Carl Sanders, former call-boy for the Chesapeake & Ohio at Covington, Ky., is now engaged in another field of transportation, namely propelling horses round and round the race track, as a jockey. Carl's father and brother, however, respectively machinist and yard brakeman for the C. & O., predict an early return to the railway for Carl, despite several winners he rode last year.

A Man-Sized Conscience

"Conscience money" to the extent of $1,360.28 has been received by the treasurer of the Atlantic region of the Canadian National, the largest single contribution of such character ever recorded by that official. "Conscience money" was written on the outside of the envelope, which was addressed to the comptroller's office but there was no explanation offered as to the reason for restitution of such a large amount. B. A. Bourgeois, treasurer, with nearly 40 years' experience, and A. E. Plant, comptroller, declared that, while three or four sums are received each year for "conscience money," these items rarely exceed $20, and once rose to $60, but the present contribution has established a new record for penitential repayments.

Padding the Rails

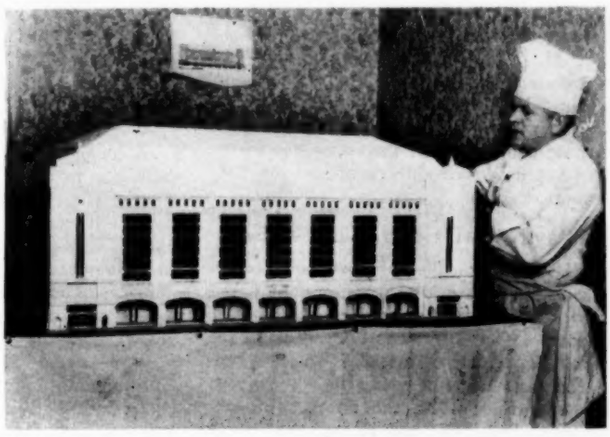
From far off Singapore one hears of a recent experiment and one of reasonable success in noise reduction upon the rail lines operated by the Federated Malay States. In order to deaden the noise and reduce vibration incident to the operation of trains, specially prepared rubber plates were placed between the rails and ties. The test was confined to a short stretch of line but was attended with so much success that a much longer distance will be rubberized. Incidentally, if this idea was ever adopted in the United States there would be a sufficient number of automobile tires discarded every year here to equip 20,000 miles of track annually.—Wall Street Journal.

Wanted—A Good Cure for Snake Bite

In the future, all railroads operating lines in Nebraska must see that no snakes trespass on their property, or pay the consequence in the event that any person is bitten. On January 18, 1929, the Nebraska Supreme Court allowed a judgment of $28,000 against the Chicago & North Western to Herbert R. Brannon, who was bitten three times on one finger by a snake which jumped or fell into the gauntlet of his glove while he was at work in an engine pit at Chadron, Neb., on July 23, 1924. He became seriously ill, and it was claimed at the trial that he might continue to suffer for the rest of his life. The railroad pleaded that a snake bite is "a common risk of all mankind" and that it could not be held responsible for the reptile's presence. Considering the fact that snakes usually prefer the "wide open spaces" or woodlands as a place of abode, remedies for snake bite should have a good market in Nebraska, especially during the harvest season. Having to dig up $28,000 per farm hand snake-bitten will, according to reports from Washington, be a hard wallop on the average farmer's pocket book.

Pastry for Celebrations

In two widely separated sections of the country, pastry was recently put to rather unusual uses. At the opening of the new North Station of the Boston & Maine at Boston, a huge cake was baked that was a replica of the new station, as shown in one of the accompanying illustrations. The other illustration depicts the pastry model which attracted much interest at the celebration attending the opening of the Cascade tunnel of the Great Northern.



The New North Station in Cake

Pastry Replica of the Cascade Tunnel

NEWS *of the* WEEK

Great Northern Terminal at Spokane, Wash.

O. B. COLQUITT, former governor of Texas, has been recommended to President Hoover by Senators and others for appointment as a member of the United States Board of Mediation to succeed Pat M. Neff, whose reappointment was not confirmed by the Senate, after a fight against his confirmation had been made by the railroad labor organizations. The Senate committee on interstate commerce had voted a favorable report on his confirmation.

Wage Statistics for December

The number of employees reported by Class I railways to the Interstate Commerce Commission as of the middle of the month of December was 1,621,910, and the total compensation was $230,944,242. Compared with the returns for the corresponding month of 1927, the number of employees reported for December, 1928, shows a decrease of 2.31 per cent and the total compensation shows a decrease of 1.94 per cent.

"Goggles Do Save Eyes"

This is the subject of Circular No. 216, in which L. G. Bentley, chairman of the Committee on Education, promulgates the schedule for the Safety section, A. R. A., for activities of safety committees during the month of April. The main feature of the circular is a picture of a distressed girl whose father is in bed because of having had one of his eyes struck by a piece of steel when he was chipping a driving box without having his goggles on. The little girl asks questions to which careless workmen are unable to give satisfactory answers.

Corrections

In the *Daily Railway Age* of March 5, —page D5, the statement was made that F. W. Pfleging, signal engineer of the Pennsylvania, made a motion that President Hoover be elected a member of the Signal Section. Mr. Pfleging is, of course, signal engineer of the Union Pacific rather than the Pennsylvania.

In the *Railway Age* of February 16, page 406, in an article entitled, "What is Depreciation?" by H. E. Hale, the statement was made in paragraph (D) in the second column, that the depreciation in the property of the Worcester (Mass.) Electric Light Company was found by Stone & Webster to amount to 80 per cent. This should have read 8 per cent.

Low Fuel Consumption

A new record in fuel conservation by road locomotives was established by the railroads in 1928, according to complete reports for the year. An average of 127 pounds of fuel was required in 1928 to haul one thousand tons of freight and equipment, including locomotive and tender, a distance of one mile. This was the lowest average ever attained by the railroads since the compilation of these reports began in 1918, being a reduction of four pounds under the best previous record established in 1927. A new record was also made as to fuel used in passenger service, an average of 15 pounds being required to haul each passenger train car one mile, compared with 15.4 pounds in 1927.

The total fuel bill of the railroads for both road and yard switching service in 1928 amounted to $342,327,567, compared with $373,001,839 in 1927. The railroads used 111,572,184 tons of coal for both road and yard switching service. In 1927 the amount was 115,117,577 tons. They also consumed in road and yard switching service during 1928 a total of 2,442,790,701 gallons of fuel oil compared with 2,376,-644,528 gallons in 1927.

Baseler's Automatic Train Control

The latest automatic train stop comes from Germany. Connection between roadway and locomotive is made by means of a ray of light which, originating on the locomotive and striking a mirror which is mounted on the roadside semaphore, is reflected from the mirror to a selenium cell on the locomotive; and the action of the light on the selenium closes a local electric circuit, which, after being amplified, actuates the brake setting apparatus. The German State Railroad Company announces that very satisfactory experiments have been made with the device. Dr. Baseler, the inventor, is an engineer on the technical staff of the Bavarian division of the State railroads. The mirror, 4 inches in diameter, has numerous facets and is said to be completely protected from the influence of any light except that sent out from the locomotive. In hundreds of tests, there have been no undesired operations nor any failures.

Experiments have been made with speed control, but no description is given of the means of doing this.

The inventor proposes to use the mirror and selenium cell also for conveying information to the engineman. The arrangement could, of course, be used to actuate a visual or audible cab signal, without setting brakes.

Explosives Handled Safely

More than 500,000,000 pounds of dangerous explosives, largely used for commercial purposes, were handled by the railroads of the United States and Canada in 1928 without death or injury to any person and with a property loss amounting to only $77, according to a report for the year of the Bureau of Explosives of the American Railway Association.

The remarkable performance was brought about largely by the cooperation of the manufacturers and the carriers together with thousands of factory and railway employees in the careful packing, loading and transporting of a commodity which constitutes one of the greatest potential hazards the railroads are called upon to move.

In connection with the transportation only twelve accidents occurred, all of which involved so-called "luxury" explosives, that is, those intended for amusement purposes—toy torpedoes and toy caps. In a majority of instances, these accidents resulted from the dropping of packages.

Fifteen fatalities resulted from accidents involving shipments of inflammable liquids, gasoline accounting for ten. Of these ten, eight occurred in one tank car wreck followed by fire, the eight being tramps riding in a box car which burned.

Five other persons lost their lives in two freight wrecks in which cars of crude oil were burned, three employees in one case being trapped by flames during the clearing of wreckage and in the other case two trespassers lost their lives. Of the fifteen persons who lost their lives as a result of the ignition of inflammable liquids while in transit, ten were trespassers.

While the railroads also handled in 1928 millions of pounds of acids, compressed gases, corrosive and poisonous liquids, and scores of other semi-dangerous articles, reports show that no person was killed as a result of accidents involving the movement of such hazardous commodities.

Canadian Branch Line Bills

Rapid progress was made last week in the Canadian House of Commons Committee on Railways, Canals and Telegraph Lines on the branch line programs of the Canadian Pacific and the Canadian National. The entire program of the latter road, consisting of 17 different branches aggregating a little over 700 miles and to cost about $28,000,000 was approved by the Committee and now remains for final approval on the motion for third reading of the bills in the House. They will then be sent to the Senate for consideration. Similar treatment was given to the Canadian Pacific, with the exception of one branch line from Melfort to Sutherland, in Saskatchewan, which was deleted from the bill by the Committee. A bill for a line in the same territory for the Canadian National was approved. It was over this particular territory that the two roads could not agree and when the question was left to the House Committee the Canadian National was favored.

Efforts were made by the Progressive group in the Committee, led by Robert Gardiner of Alberta, to put the two roads on the same basis in the matter of constructing lines. At present the Canadian National scheme is on a three-year basis, that is, any program approved must be completed in three years. The Canadian Pacific, by their legislation, have two years within which to begin construction, to do 15 per cent of the work, and five years within the granting of the charter to complete a line. If a line is not begun in two years or is not completed within five years, the charter legally expires and must be revived at the next succeeding session of Parliament, if desired.

Mr. Gardiner last week moved an amendment in committee to the Canadian Pacific bill to make its requirements the same as the C. N. R. The amendment was defeated by a large majority.

An amendment to the C. P. R. bill to encourage closer co-operation between the two roads regarding trackage rights was moved by Dr. Murray MacLaren (St. John, N. B.) and adopted by the Committee.

Montreal Terminal Plan Not Acceptable to C. P.

Declaring that the plans for joint union terminal in Montreal as formulated by Frederick Palmer, London engineer, and which were recently made public at Ottawa by Hon. Charles A. Dunning, Minister of Railways and Canals, are not acceptable President E. W. Beatty, of the Canadian Pacific Railway, in a statement made public in Montreal last week intimated, however, that the door was not shut to some possible future co-operation with the Canadian National Railways in the matter of terminal facilities. Mr. Beatty's statement reads in part:

The report of Mr. Frederick Palmer is an interesting document and, having had the advantage of several conferences with him while his ideas were being formulated, I was naturally not surprised at the character of his recommendations.

No one can reasonably question the right of the Canadian National Railway to improve its terminal facilities in Montreal, and in consequence, the only problem which arises is whether the plan submitted is the best for both the railway and the public. The Canadian Pacific is not directly concerned with plans which involve improvements for the exclusive use of the National System and only becomes so if its interests are thereby prejudiced or if joint facilities are recommended. My company has not asked for a union passenger terminal and much less does it suggest joint freight and passenger facilities and electrification for the whole Island of Montreal.

On the Island of Montreal the Canadian Pacific is particularly favorably situated to serve the public. Within the limits of the cities of Outremont, Montreal West, Westmount and Montreal, it has on its running tracks only ten necessary grade separations, which can be eliminated individually in reasonable time.

It has valuable and admirably located passenger terminals, which would inevitably be scrapped if a joint terminal at the Tunnel site were selected, and which can readily be extended at moderate cost to take care of any expansion of business likely to occur for many years.

When this company was asked by the Board of Railway Commissioners to submit its views in 1928, we retained two firms of experts to make a special survey of the Montreal Terminal situation, and they concluded that the best solution of the problem was a joint station in the east end and a separate station or joint stations in the west end. Their findings are of particular interest when it is realized that they advised that such a union terminal project can be consummated at the Windsor street site at a gross cost of some thirty million dollars less than can the scheme proposed by Mr. Palmer at the Tunnel site and that by use of east and west end stations a still larger part of the proposed expenditure could be eliminated.

They also pointed out that the rail approach to Windsor station is much superior for the principal traffic, which is from the west, and with certain connections, which could be made, that station would have exactly the same facility of radiation, north, south and east, as those indicated in Mr. Palmer's proposals.

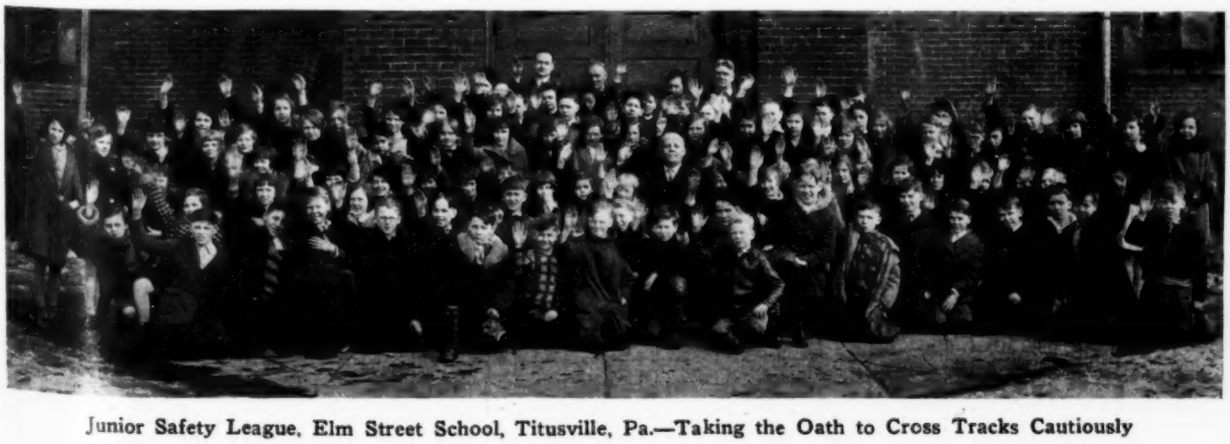
As usual, when experts are called in, they do not entirely agree and the problem in the attempt to make it a joint one is entitled to all the consideration it is possible to give it. I have no objection to Mr. Palmer's suggestion as to a joint body to consider the larger question, if in their work is included a consideration of the feasibility of joint passenger terminals or otherwise. If a committee representing the various interests is established, the Canadian Pacific will appoint a representative and furnish all the data collected through the surveys it has caused to be made during the past year.

Track Walking Cured

The Police department of the Allegheny division of the Pennsylvania reports that for a period of 539 days, no child has been killed or injured on the tracks of that division, and one of the reasons for this record is illustrated in the photograph here reproduced, which represents 90 boys and girls, who belong to the Junior Safety League of the Elm Street School, Titusville, Pa. These children are being addressed by A. G. Lowery, sergeant of police of the Pennsylvania, who administers to them the League's oath—"I promise to remember to look up and down before crossing a street or a railroad."

Four years ago an average of five fatal injuries yearly to children walking or playing on tracks in this territory was almost to be expected; and the improvement has been due to a persistent safety campaign carried on by the captain of police, C. F. Carr, his aide, Mr. Lowery and four other officers: Messrs. Gribbs, Haugh, Mooney and Henry. Representatives of the police department make the rounds each year through all the high schools and grade schools in the territory adjacent to the railroad, and they have become ac-

(*Continued on page 639*)



Junior Safety League, Elm Street School, Titusville, Pa.—Taking the Oath to Cross Tracks Cautiously

Revenues and Expenses of Railways

MONTH OF JANUARY OF CALENDAR YEAR 1929

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Akron, Canton & Youngstown	Jan.	171	$300,437	$169	$309,475	$40,667	$25,742	$13,647	$78,323	$14,810	$171,611	55.5	$137,864	$115,276	$79,113	$34,454
Atchison, Topeka & Santa Fe	Jan.	9,391	11,687,049	3,030,755	16,085,393	1,663,045	3,416,950	452,388	5,134,619	463,365	11,136,325	69.2	4,949,068	3,516,273	3,581,417	2,447,711
Gulf, Colorado & Santa Fe	Jan.	1,944	2,082,325	184,241	2,395,659	364,996	457,132	58,103	752,672	68,124	1,700,220	71.0	695,439	614,931	496,874	26,648
Panhandle & Santa Fe	Jan.	1,024	915,895	100,250	1,081,028	113,043	194,734	13,298	314,911	27,930	662,073	61.2	418,955	360,435	281,447	115,459
Atlanta & West Point	Jan.	93	148,144	53,462	234,872	25,119	44,194	12,336	89,585	13,622	189,298	80.6	45,574	30,281	19,982	37,855
Western of Alabama	Jan.	133	152,387	57,478	236,066	32,716	54,505	12,486	85,197	13,949	203,065	86.0	33,001	15,396	17,187	83,921
Atlanta, Birmingham & Coast	Jan.	639	300,270	21,906	360,383	84,934	81,727	29,300	148,927	20,181	376,294	104.4	—15,911	—32,706	—41,482	—34,798
Atlantic Coast Line	Jan.	5,143	4,681,447	1,358,944	6,607,273	842,277	1,067,953	185,739	2,202,458	186,426	4,561,301	69.0	2,045,972	1,444,839	1,456,691	836,728
Charleston & Western Carolina	Jan.	342	229,398	11,144	250,763	54,149	39,402	6,641	95,062	6,545	201,794	80.5	48,969	27,472	34,300	35,175
Baltimore & Ohio	Jan.	5,639	15,716,772	1,841,795	18,767,270	2,328,719	4,096,516	465,328	7,005,752	683,389	14,765,567	78.7	4,001,703	2,974,043	2,715,615	1,907,124
Baltimore & Ohio Chicago Terminal	Jan.	82	.....	.....	313,768	31,170	42,913	2,209	186,955	16,517	288,989	91.1	27,779	—28,023	57,485	59,749
Staten Island Rapid Transit	Jan.	23	105,436	111,457	228,151	29,204	20,278	2,000	108,836	15,891	176,209	77.2	51,942	32,937	—1,782	1,289
Bangor & Aroostook	Jan.	619	659,065	61,792	747,059	100,889	118,683	4,874	193,399	28,544	449,302	60.1	297,757	238,632	237,382	215,427
Belt Ry. Co. of Chicago	Jan.	41	.....	.....	637,728	42,662	72,522	3,949	340,408	13,357	472,898	74.2	164,830	114,313	164,902	142,089
Bessemer & Lake Erie	Jan.	227	684,877	8,226	709,708	51,180	332,475	14,564	262,668	35,881	688,538	97.0	21,170	—3,196	46,076	—27,964
Bingham & Garfield	Jan.	33	41,523	.....	43,518	10,685	2,165	1,837	11,200	4,285	30,346	69.7	13,172	5,089	23,116	17,473
Boston & Maine	Jan.	2,080	3,913,549	1,387,074	6,041,092	953,933	1,000,495	89,983	2,346,084	214,686	4,613,762	76.37	1,427,330	1,131,387	897,511	798,105
Brooklyn East. Dist. Terminal	Jan.	11	112,609	.....	115,193	4,422	10,392	1,062	41,736	6,663	64,275	55.8	50,918	42,246	42,246	40,173
Buffalo & Susquehanna	Jan.	253	163,905	1,251	175,549	28,246	46,321	1,915	51,722	8,391	136,595	77.8	38,954	36,854	55,270	20,793
Buffalo, Rochester & Pittsburgh	Jan.	601	1,306,682	79,777	1,426,459	134,402	377,364	35,280	549,478	46,142	1,143,108	80.1	283,351	233,281	250,000	230,100
Canadian Pacific Lines in Maine	Jan.	233	349,416	29,764	391,849	25,463	79,745	6,111	192,861	4,486	308,666	78.7	83,183	68,683	33,192	63,999
Canadian Pacific Lines in Vermont	Jan.	85	96,965	43,272	159,304	21,542	32,436	1,785	97,469	1,866	155,098	97.4	4,206	186	—33,184	—66,677
Central of Georgia	Jan.	1,944	1,426,890	301,877	1,913,177	253,417	352,856	68,749	767,635	89,236	1,545,585	80.8	367,592	260,465	291,109	285,029
Central of New Jersey	Jan.	690	3,664,161	674,572	4,609,067	399,527	1,086,941	49,471	1,827,230	137,461	3,525,737	76.5	1,083,330	867,869	703,755	469,028
Central Vermont	Jan.	412	458,845	89,214	614,656	82,537	96,928	16,527	284,057	23,034	505,092	82.2	109,564	93,403	100,055	—437,145
Chesapeake & Ohio	Jan.	2,730	9,757,965	532,278	10,639,199	1,585,099	2,464,647	140,065	2,813,917	283,744	7,315,773	68.8	3,323,426	2,629,257	2,851,906	2,222,628
Chicago & Alton	Jan.	1,028	1,536,664	515,802	2,275,567	186,791	558,197	84,115	946,541	62,048	1,863,423	81.9	412,144	307,161	163,193	—10,262
Chicago & Eastern Illinois	Jan.	946	1,644,826	318,992	2,137,937	230,958	437,674	82,550	860,712	74,764	1,699,032	79.5	438,905	317,920	174,546	—4,470
Chicago & Illinois Midland	Jan.	131	237,434	7,951	252,016	30,141	51,939	18,504	71,979	17,860	190,390	75.5	61,626	53,691	47,742	53,774
Chicago & North Western	Jan.	8,466	7,531,857	2,114,112	10,848,504	1,276,817	2,349,293	194,455	4,932,947	383,367	9,211,529	84.9	1,636,975	860,622	626,815	887,328
Chicago, Burlington & Quincy	Jan.	9,374	10,138,059	1,583,987	12,882,806	1,126,075	2,134,648	230,025	4,580,320	382,763	8,536,217	66.3	4,346,589	3,142,341	2,869,325	2,678,357
Chicago Great Western	Jan.	1,495	1,479,988	247,204	1,885,557	180,510	349,082	84,862	929,539	58,705	1,615,325	85.7	270,232	187,153	45,738	—12,582
Chicago, Indianapolis & Louisville	Jan.	650	1,103,241	167,273	1,414,527	127,976	319,022	39,248	576,512	38,496	1,114,832	78.8	299,695	226,895	112,239	115,923
Chicago, Mil., St. Paul & Pacific	Jan.	11,251	9,864,367	1,479,133	12,624,691	1,359,738	2,578,103	271,860	5,289,311	381,054	9,952,860	78.8	2,671,831	1,827,639	1,343,139	972,402
Chicago River & Indiana	Jan.	20	.....	.....	592,892	41,777	51,680	718	227,124	14,114	335,413	56.6	257,479	211,340	303,706	246,968
Chicago, Rock Island & Pacific	Jan.	7,564	8,254,009	1,733,339	10,963,347	1,345,469	2,154,465	245,090	4,356,774	369,319	8,586,101	78.3	2,377,246	1,651,341	1,252,549	1,092,806
Chicago, Rock Island & Gulf	Jan.	516	481,330	67,768	591,588	61,062	61,035	20,172	196,903	18,825	360,480	60.9	231,108	204,207	165,347	147,159
Chicago, St. Paul, Minn. & Omaha	Jan.	1,746	1,542,930	350,690	2,062,622	253,178	391,964	39,396	1,062,279	82,407	1,839,372	89.2	223,250	110,932	53,874	48,574
Clinchfield Railroad	Jan.	309	584,579	14,544	611,188	56,341	134,482	21,986	132,132	17,911	363,032	59.4	248,156	173,117	274,491	229,876
Colorado & Southern	Jan.	1,035	827,466	93,248	1,005,481	106,655	208,861	16,009	368,493	45,380	752,630	74.9	252,851	172,584	156,220	182,763
Ft. Worth & Denver City	Jan.	695	820,391	151,326	1,033,369	93,717	142,683	19,262	304,846	42,110	614,141	59.4	419,228	349,139	345,354	299,513
Wichita Valley	Jan.	271	127,435	9,687	143,437	20,762	10,873	41	43,951	1,972	77,402	54.0	66,035	57,184	35,727	40,858
Columbus & Greenville	Jan.	167	139,533	20,155	170,242	38,407	19,683	4,339	62,541	14,121	139,088	81.7	31,154	27,255	12,892	6,633
Conemaugh & Black Lick	Jan.	22	64,581	.....	147,866	13,196	18,764	869	92,913	3,519	130,261	88.1	17,605	16,605	11,884	—9,047
Delaware & Hudson	Jan.	881	2,690,208	289,281	3,187,879	451,567	810,147	52,793	1,253,139	170,677	2,742,861	86.0	445,018	356,018	339,484	19,909
Delaware, Lackawanna & Western	Jan.	998	5,018,673	946,046	6,703,609	669,045	1,263,675	135,067	2,761,002	186,272	5,058,432	75.5	1,645,177	1,112,620	1,104,778	859,546
Denver & Rio Grande Western	Jan.	2,547	2,342,625	230,148	2,748,929	386,639	522,190	56,580	850,248	87,023	1,930,017	70.2	818,912	653,909	717,055	607,349
Denver & Salt Lake	Jan.	232	361,489	18,345	396,675	31,341	77,892	1,567	58,064	11,415	180,279	45.4	216,397	206,397	214,667	167,299
Detroit & Mackinac	Jan.	300	70,062	13,809	89,997	15,239	31,772	2,029	41,976	5,729	96,793	107.5	—6,796	—17,348	—14,692	333
Detroit & Toledo Shore Line	Jan.	50	448,821	.....	454,019	24,810	36,706	7,749	118,508	10,044	197,817	43.6	256,202	220,823	128,335	105,556
Detroit Terminal	Jan.	19	.....	.....	221,319	18,212	20,301	.....	97,189	4,480	140,182	63.3	81,137	61,142	62,781	17,368
Detroit, Toledo & Ironton	Jan.	495	1,314,646	3,408	1,344,125	97,474	172,605	11,825	311,207	29,763	622,090	46.3	722,035	633,767	524,468	24,106
Duluth & Iron Range	Jan.	269	79,996	7,045	100,464	58,659	114,822	1,629	87,840	17,149	280,099	278.8	—179,635	—199,540	—201,093	—195,363
Duluth, Missabe & Northern	Jan.	307	62,138	4,600	79,490	71,211	176,125	3,050	132,520	23,028	405,812	510.5	—326,322	—424,546	—428,844	—386,414
Duluth, Winnipeg & Pacific	Jan.	178	185,955	13,893	208,088	20,046	41,700	4,710	81,546	7,463	157,896	75.9	50,192	39,788	45,226	37,764
Elgin, Joliet & Eastern	Jan.	451	1,777,944	6	1,961,520	173,732	414,006	14,942	760,472	53,516	1,416,609	72.2	544,911	438,108	248,410	278,731
Erie Railroad	Jan.	2,047	7,398,295	806,383	8,904,708	866,969	2,146,841	172,587	3,600,317	298,552	7,130,492	80.1	1,774,216	1,388,698	1,302,574	539,445
Chicago & Erie	Jan.	269	1,086,983	48,166	1,212,283	124,924	122,773	28,548	389,052	42,170	706,909	58.3	505,374	449,259	146,709	—117,490
New Jersey & New York	Jan.	45	24,729	93,635	122,958	13,477	17,356	1,514	71,407	3,606	107,354	87.3	15,604	11,496	—20,907	—35,974
N. Y., Susquehanna & Western	Jan.	131	344,311	42,288	421,992	13,292	19,034	4,964	206,464	11,506	315,255	74.7	106,737	75,679	51,259	—26,271
Evansville, Indianap. & Terre Haute	Jan.	146	181,142	3,644	190,726	21,587	21,656	2,161	66,932	6,266	118,432	62.1	72,294	64,163	29,076	13,230
Florida East Coast	Jan.	853	704,995	473,116	1,364,123	184,266	173,742	36,962	388,516	53,713	870,336	63.8	493,787	352,888	285,742	150,439

Revenues and Expenses of Railways

N. Y., Susquehanna & Western	Jan.	131	344,311	42,288	451,992	21,547	20,944	4,484	200,484	17,308	313,255	74.7	106,737	75,679	81,259	26,277
Evansville, Indianap. & Terre Haute	Jan.	146	181,142	3,644	190,726	21,587	21,656	2,161	66,932	6,266	118,432	62.1	72,294	64,163	29,076	13,230
Florida East Coast	Jan.	853	704,995	473,116	1,364,123	184,266	173,742	36,962	388,516	53,713	870,336	63.8	493,787	352,888	285,742	150,439

Revenues and Expenses of Railways

MONTH OF JANUARY OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
Fort Smith & Western	Jan.	249	$133,846	$9,888	$152,671	$25,389	$28,819	$6,144	$46,140	$7,125	$112,654	73.8	$40,017	$35,255	$27,191	$1,818
Galveston Wharf	Jan.	13	.....	.....	228,931	41,390	4,695	4,132	34,257	8,879	114,764	50.1	114,167	97,167	97,175	23,336
Georgia R. R.	Jan.	328	323,601	54,687	411,744	43,770	90,441	21,974	189,253	23,686	369,282	89.7	42,462	34,330	51,245	49,628
Georgia & Florida	Jan.	445	94,515	8,951	112,578	24,674	25,577	9,942	52,496	8,608	118,327	105.1	—5,749	—15,474	—10,649	1,865
Grand Trunk Western	Jan.	345	1,432,995	174,343	1,691,424	126,080	372,361	43,003	607,185	68,317	1,230,755	72.8	460,669	369,169	313,905	216,454
Atlantic & St. Lawrence	Jan.	166	126,406	32,373	175,179	32,154	43,719	5,799	109,540	7,970	200,996	114.7	—25,817	—40,717	—97,259	—77,609
Chic., Det. & Canada Gr. Tr. Jct.	Jan.	59	284,356	799	330,389	18,640	16,718	4,663	93,377	4,167	141,526	42.8	188,863	177,963	152,648	104,793
Detroit, Grand Haven & Mil.	Jan.	192	555,073	27,222	635,142	55,155	66,274	13,713	279,922	19,378	434,104	68.3	201,038	189,188	101,255	43,681
Great Northern	Jan.	8,401	5,701,882	910,445	7,355,640	1,064,683	1,658,784	253,546	3,127,503	176,786	6,346,347	86.3	1,009,293	323,365	258,743	376,601
Green Bay & Western	Jan.	234	136,411	7,265	149,758	22,864	25,281	5,485	73,481	3,131	129,727	86.6	20,031	12,031	6,914	19,139
Gulf & Ship Island	Jan.	307	204,155	36,644	261,768	48,105	47,782	5,753	101,131	8,298	213,895	81.7	47,873	15,383	6,927	1,508
Gulf, Mobile & Northern	Jan.	733	547,321	24,393	599,600	88,709	99,608	31,924	188,106	29,711	438,349	73.11	161,251	121,204	90,056	71,931
Hocking Valley	Jan.	348	1,444,165	63,210	1,578,219	186,138	300,796	16,791	452,576	45,138	1,001,438	63.5	576,781	446,451	464,353	181,425
Illinois Central	Jan.	5,037	10,114,934	2,050,362	12,994,365	1,365,342	2,814,205	308,194	4,838,460	368,271	9,780,282	75.3	3,214,083	2,307,201	2,249,542	1,868,474
Yazoo & Mississippi Valley	Jan.	1,705	1,736,118	267,298	2,137,424	354,494	382,658	44,579	855,171	65,651	1,707,796	79.9	429,628	259,421	186,076	183,837
Illinois Central System	Jan.	6,742	11,863,023	2,321,515	15,147,617	1,719,836	3,200,454	352,773	5,703,571	434,069	11,501,756	75.9	3,645,861	2,567,856	2,436,852	2,048,311
Illinois Terminal	Jan.	473	454,761	148,739	625,190	64,125	75,041	18,997	210,506	43,132	411,801	65.87	213,389	192,107	148,250	123,140
Kansas City, Mexico & Orient	Jan.	272	160,459	4,787	175,272	38,373	44,270	7,258	61,387	8,364	159,589	91.1	15,683	6,038	24,462	48,131
Kansas City, Mex. & O. of Texas	Jan.	465	305,438	13,162	335,858	126,987	58,773	8,526	85,120	9,519	288,129	85.8	47,729	36,168	—11,996	21,192
Kansas City Southern	Jan.	784	1,311,420	78,529	1,533,089	183,870	246,273	60,178	482,892	86,025	1,059,448	69.1	473,641	355,968	290,915	211,604
Texarkana & Ft. Smith	Jan.	81	239,628	6,714	260,712	21,915	26,763	6,575	63,080	9,822	130,678	50.1	130,034	113,197	80,960	64,575
Kansas, Oklahoma & Gulf	Jan.	326	292,726	2,752	301,464	40,279	33,854	13,043	68,299	10,416	164,842	34.7	136,622	116,383	92,562	62,199
Lake Superior & Ishpeming	Jan.	160	58,042	1,917	63,450	27,118	30,558	500	35,889	6,958	101,023	159.2	—37,573	—50,543	—54,756	—40,224
Lake Terminal	Jan.	13	.....	.....	74,929	11,248	15,413	.....	46,541	1,987	75,189	100.3	—260	—4,785	—1,604	—11,929
Lehigh & Hudson River	Jan.	96	206,238	1,164	216,729	23,075	31,384	2,594	80,469	9,548	147,070	67.9	69,659	54,914	38,156	18,438
Lehigh & New England	Jan.	216	374,941	1,058	380,795	38,619	96,698	12,925	144,275	17,277	309,794	81.4	71,001	59,821	64,377	*,308
Lehigh Valley	Jan.	1,361	4,647,122	522,294	5,607,991	423,999	1,361,858	136,546	2,425,914	166,242	4,545,542	81.1	1,062,449	798,339	603,365	—152,484
Louisiana & Arkansas	Jan.	301	298,963	9,388	314,511	52,941	53,707	12,125	81,441	12,670	213,491	67.9	101,020	68,000	57,239	45,898
Louisiana Ry. & Nav. Co.	Jan.	338	268,873	8,558	293,631	54,629	37,298	13,747	119,123	12,383	234,968	80.0	58,663	37,654	8,837	—31,450
Louisiana Ry. & Nav. Co. of Texas	Jan.	206	76,232	3,121	82,572	19,623	12,879	3,206	38,487	5,388	79,583	96.4	2,989	—3,022	—15,742	—11,941
Louisville & Nashville	Jan.	5,068	8,665,205	1,402,068	10,759,305	1,618,217	2,439,888	304,701	3,899,347	359,762	8,684,609	80.7	2,074,696	1,486,731	1,573,769	1,503,049
Louisville, Henderson & St. Louis	Jan.	199	222,525	37,604	277,904	37,368	49,399	7,095	105,236	11,895	212,772	76.6	65,132	46,996	39,313	27,597
Maine Central	Jan.	1,122	1,143,760	248,622	1,519,340	204,321	303,700	15,784	644,878	55,709	1,224,389	80.6	294,951	208,597	154,010	183,703
Midland Valley	Jan.	364	290,751	12,586	313,329	42,954	29,400	5,950	82,601	12,114	172,953	55.2	140,376	123,570	100,294	76,657
Minneapolis & St. Louis	Jan.	1,627	979,415	72,221	1,111,433	103,476	211,284	38,558	580,493	45,401	977,024	87.9	134,409	69,860	22,214	—94,110
Minneapolis, St. Paul & S. S. Marie	Jan.	4,384	2,529,071	400,443	3,168,514	445,065	712,171	74,452	1,499,914	120,043	2,846,188	89.8	322,326	93,537	—3,755	91,213
Duluth, South Shore & Atlantic	Jan.	573	281,001	70,946	375,562	58,671	69,045	8,044	192,747	12,016	343,495	91.5	32,072	72	—14,797	32,221
Spokane International	Jan.	165	65,077	9,122	81,025	18,490	7,334	3,477	36,682	6,175	73,252	90.4	7,773	2,309	—3,264	6,875
Mississippi Central	Jan.	161	121,935	6,621	133,304	16,780	25,452	9,732	36,342	8,295	96,601	72.5	36,703	27,277	28,220	25,708
Missouri & North Arkansas	Jan.	364	119,729	9,764	137,691	32,259	22,408	9,402	65,955	7,897	138,199	100.4	—508	—2,999	—14,517	—29,632
Missouri-Kansas-Texas Lines	Jan.	3,188	3,632,445	591,181	4,578,782	540,335	965,048	129,176	1,418,089	169,728	3,239,600	70.8	1,339,182	1,069,267	847,565	732,510
Missouri Pacific	Jan.	7,461	8,861,666	1,170,983	10,857,963	1,434,007	2,047,528	318,308	4,063,674	384,460	8,255,055	76.0	2,602,908	2,146,792	1,712,989	1,362,180
Gulf Coast Lines	Jan.	1,026	1,082,770	128,349	1,270,145	212,967	237,321	44,026	405,018	59,463	954,587	75.16	315,558	268,185	195,919	130,414
International-Great Northern	Jan.	1,159	1,170,263	191,862	1,496,233	256,370	272,777	31,659	637,455	69,150	1,254,184	83.82	242,049	199,789	82,534	41,675
San Antonio, Uvalde & Gulf	Jan.	318	121,948	17,776	150,408	41,977	25,857	6,725	43,074	8,279	126,346	84.0	24,062	19,895	—5,135	2,498
Texas & Pacific	Jan.	2,015	3,054,311	470,890	3,760,816	536,626	655,442	83,415	1,272,544	126,279	2,667,441	70.9	1,093,375	890,893	568,285	541,126
Mobile & Ohio	Jan.	1,159	1,209,058	87,602	1,372,788	202,376	289,767	59,681	525,516	50,748	1,128,148	82.2	244,640	150,243	107,480	97,384
Monongahela	Jan.	171	646,542	12,233	663,911	80,000	75,000	1,335	174,534	11,264	341,254	51.4	322,657	295,681	188,615	136,864
Monongahela Connecting	Jan.	6	.....	.....	195,574	20,410	34,649	300	90,787	4,382	150,528	77.0	45,046	35,897	31,725	21,313
Montour	Jan.	56	165,047	.....	165,236	13,763	44,254	1,121	40,414	7,304	105,441	63.8	59,795	58,295	67,701	39,443
Nashville, Chattanooga & St. Louis	Jan.	1,259	1,353,617	271,866	1,818,023	223,020	394,011	97,338	686,206	83,297	1,492,505	82.1	325,518	243,404	243,837	81,712
Nevada Northern	Jan.	165	98,280	5,873	113,083	11,820	6,543	535	18,796	4,537	42,545	37.6	70,538	54,552	53,043	18,976
Newburgh & South Shore	Jan.	6	.....	.....	131,604	9,982	37,732	.....	65,080	6,302	119,096	90.5	12,508	—1,465	8,219	—15,865
New Orleans Great Northern	Jan.	276	231,468	14,122	253,317	35,947	32,702	13,225	79,684	11,889	173,452	68.5	79,865	61,995	37,835	59,236
New Orleans Terminal	Jan.	20	1,919	.....	132,050	20,550	7,040	.....	59,832	1,541	88,963	67.4	43,087	32,090	21,807	17,709
New York Central	Jan.	6,906	18,758,939	8,400,912	31,055,490	3,471,239	7,124,257	471,665	11,584,116	923,851	24,138,388	77.7	6,917,102	4,647,070	4,417,230	3,636,516
Cincinnati Northern	Jan.	244	291,326	4,768	301,972	41,984	72,109	6,255	117,636	10,942	248,927	82.4	53,045	34,678	18,037	4,177
Cleve., Cinn., Chicago & St. Louis	Jan.	2,397	5,698,798	1,282,429	7,546,709	666,100	1,759,448	152,553	2,953,727	245,737	5,864,973	77.7	1,681,736	1,252,706	1,146,206	769,288
Indiana Harbor Belt	Jan.	130	.....	.....	994,852	108,000	123,837	4,563	461,042	26,396	735,771	74.0	259,081	201,043	156,971	137,077
Michigan Central	Jan.	1,858	5,063,503	1,795,529	7,591,666	660,408	1,685,624	130,479	2,640,459	179,872	5,408,753	71.2	2,182,913	1,652,741	1,494,127	1,375,523
Pittsburgh & Lake Erie	Jan.	231	2,336,110	196,514	2,630,529	345,374	937,632	29,007	925,093	80,869	2,328,443	88.5	302,086	148,330	517,039	433,559
New York, Chicago & St. Louis	Jan.	1,690	4,057,836	128,570	4,321,725	457,091	852,888	126,230	1,645,291	146,587	3,226,353	74.6	1,095,372	856,594	656,354	570,425

Revenues and Expenses of Railways

MONTH OF JANUARY OF CALENDAR YEAR 1929—CONTINUED

Name of road		Av. mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Operating income (or loss).	Net ry. operating income.	Net ry. operating income, 1928.
N. Y., New Haven & Hartford	Jan.	2,129	$5,602,880	$3,806,896	$10,594,893	$1,193,096	$2,033,456	$106,057	$3,632,965	$360,167	$7,512,001	70.9	$3,082,892	$2,340,236	$1,868,132	$1,318,239
New York Connecting	Jan.	20	217,966	.....	243,134	208,022	Cr. 10,297	.....	30,424	2,079	230,228	94.7	12,906	—25,094	—46,391	87,328
New York, Ontario & Western	Jan.	568	676,929	56,894	873,548	102,436	198,977	19,638	457,396	36,101	821,244	94.0	52,304	7,252	—33,969	—100,515
Norfolk & Western	Jan.	2,240	8,302,558	454,112	9,036,456	1,068,571	1,787,124	121,601	2,296,393	247,181	5,541,371	61.3	3,495,085	2,694,906	2,910,639	1,784,583
Norfolk Southern	Jan.	931	540,231	33,849	616,968	82,925	107,930	26,714	260,686	31,147	501,122	81.2	115,846	64,383	50,238	110,733
Northern Pacific	Jan.	6,792	4,977,262	802,798	6,409,128	651,527	1,536,347	241,655	2,715,316	267,720	5,493,751	85.7	915,377	262,045	677,639	685,535
Northwestern Pacific	Jan.	477	228,889	108,732	384,477	105,092	90,246	7,281	231,339	21,079	454,799	118.3	—70,322	—108,561	—112,294	—106,403
Pennsylvania R. R.	Jan.	10,487	35,826,280	11,022,678	51,664,804	6,304,802	11,360,520	877,652	19,194,321	1,591,814	40,073,104	77.6	11,591,700	9,352,344	7,970,394	6,136,235
Long Island	Jan.	404	854,462	1,885,143	2,904,424	407,359	466,112	23,204	1,304,417	61,825	2,264,348	78.0	640,076	564,194	428,920	166,346
West Jersey & Seashore	Jan.	370	394,733	249,087	677,163	98,025	113,800	4,213	340,264	14,358	571,230	84.4	105,933	105,693	89,892	—46,772
Peoria & Pekin Union	Jan.	19	22,482	2,056	152,997	10,981	11,864	5,583	71,155	8,390	107,973	70.6	45,025	28,024	43,520	63,035
Pere Marquette	Jan.	2,241	2,790,156	272,607	3,280,305	211,200	756,171	64,413	1,267,708	113,395	2,422,213	73.8	858,092	642,612	478,066	245,749
Pittsburgh & Shawmut	Jan.	102	154,900	3,871	160,158	18,453	27,460	1,687	45,950	10,663	104,213	65.1	55,945	54,560	54,806	71,125
Pittsburgh & West Virginia	Jan.	92	394,669	4,504	435,345	20,803	64,325	16,868	80,137	21,543	215,265	49.4	220,080	163,497	236,325	137,988
Pittsburgh, Shawmut & Northern	Jan.	198	149,472	1,888	155,831	26,474	28,732	1,958	50,567	5,787	113,518	72.8	42,313	39,477	32,634	20,617
Quincy, Omaha & Kansas City	Jan.	249	39,135	8,346	53,314	13,933	7,527	751	26,108	2,387	50,662	95.0	2,652	—2,205	—4,668	—7,778
Reading	Jan.	1,460	6,892,972	652,393	8,021,935	946,485	1,879,159	91,211	3,090,869	224,346	6,259,852	78.0	1,762,083	1,377,279	1,345,017	818,326
Atlantic City	Jan.	163	106,077	78,015	200,153	60,686	31,866	3,342	171,886	5,679	273,586	136.7	—73,433	113,733	—141,523	—194,578
Perkiomen	Jan.		Will not file—included in Reading Company.													
Port Reading	Jan.		Will not file—included in Reading Company.													
Richmond, Fredericksburg & Potomac	Jan.	117	446,124	388,285	994,202	80,214	158,526	9,169	342,165	39,232	648,842	65.3	345,360	282,951	232,837	118,133
Rutland	Jan.	413	248,367	92,555	459,762	81,556	96,649	10,752	202,605	18,155	411,521	89.5	48,241	26,384	34,421	52,020
St. Louis-San Francisco	Jan.	5,304	5,105,749	929,033	6,528,611	756,849	1,267,832	127,689	2,326,994	238,136	4,697,618	71.95	1,830,993	1,373,392	1,473,530	1,363,774
Ft. Worth & Rio Grande	Jan.	233	94,677	7,870	112,943	18,040	18,753	3,065	48,915	5,174	93,618	82.9	19,325	15,151	5,993	—4,527
St. Louis-San Francisco & Texas	Jan.	154	135,890	11,920	153,991	22,635	25,098	4,959	66,200	8,200	127,087	82.5	26,904	24,010	—5,584	1,751
St. Louis Southwestern	Jan.	939	1,346,130	67,593	1,479,017	176,071	235,119	79,342	400,535	68,790	969,607	65.6	509,410	450,941	342,926	390,447
St. Louis Southwestern of Texas	Jan.	807	521,023	38,131	611,183	224,666	133,375	31,723	294,835	35,011	726,830	118.9	—115,647	—143,329	—109,828	—36,711
San Diego & Arizona	Jan.	156	90,292	26,088	117,705	17,644	15,735	4,166	33,931	7,927	80,936	68.8	36,769	30,883	29,722	15,650
Seaboard Air Line	Jan.	4,490	3,767,967	997,234	5,220,692	661,253	879,924	207,350	1,869,834	175,400	3,889,282	74.5	1,331,410	1,005,531	839,990	669,058
Southern Ry.	Jan.	6,730	8,685,205	1,997,593	11,600,839	1,787,394	2,104,214	255,128	4,004,828	372,476	8,607,698	74.2	2,993,141	2,210,699	2,127,503	1,660,251
Alabama Great Southern	Jan.	314	628,337	131,919	816,143	144,018	175,762	23,535	245,234	23,010	617,852	75.7	198,291	131,516	163,687	135,456
Cinn., New Orleans & Tex. Pacific	Jan.	338	1,394,440	324,222	1,811,174	342,320	373,185	48,318	491,731	55,221	1,325,711	73.2	485,463	379,117	384,814	300,351
Georgia Southern & Florida	Jan.	397	199,297	131,160	360,634	81,509	79,187	5,760	148,253	8,398	331,079	91.8	29,555	6,615	8,941	25,779
New Orleans & Northeastern	Jan.	204	364,495	62,710	455,494	59,386	80,410	13,120	133,269	14,325	304,157	66.8	151,337	98,844	63,788	44,475
Northern Alabama	Jan.	110	107,867	6,014	118,152	24,200	3,236	2,161	32,793	2,738	65,123	55.1	53,029	47,044	28,164	—13,049
Southern Pacific	Jan.	8,887	11,952,382	3,148,887	16,757,991	2,197,484	3,044,159	433,724	5,920,179	686,020	12,618,704	75.3	4,139,287	2,796,020	2,498,743	1,897,808
So. Pacific Steamship Lines	Jan.	....	683,072	33,818	834,234	20,241	228,792	20,142	571,330	33,436	873,941	104.8	—39,707	—41,121	—39,172	77,641
Texas & New Orleans	Jan.	4,729	4,305,555	876,205	5,618,296	963,026	1,198,747	167,707	2,031,643	267,067	4,645,731	82.7	972,565	671,168	410,410	—70,093
Spokane, Portland & Seattle	Jan.	554	511,170	81,319	651,090	67,447	98,789	10,134	222,802	25,034	428,681	65.8	222,409	137,123	135,716	88,649
Tennessee Central	Jan.	296	223,217	17,250	253,495	51,599	42,785	9,013	95,875	12,563	211,715	83.5	41,780	36,025	20,459	16,571
Terminal R. R. Assn. of St. L.	Jan.	55	.....	.....	1,051,533	118,102	85,836	3,102	499,637	30,436	740,413	70.4	311,120	213,413	302,095	363,975
Texas Mexican	Jan.	162	92,690	3,410	109,717	18,048	18,263	3,337	43,739	7,412	90,799	82.7	18,918	13,840	6,901	—25,887
Toledo, Peoria & Western	Jan.	239	176,998	1,049	185,041	14,926	21,755	11,244	68,501	8,333	124,759	67.4	60,282	52,284	43,019	3,385
Toledo Terminal	Jan.	28	.....	.....	126,158	4,748	16,795	614	56,727	6,846	85,730	68.0	40,428	23,762	49,631	56,564
Trinity & Brazos Valley	Jan.	367	211,873	6,000	225,447	47,701	38,819	5,694	102,712	11,702	205,114	91.0	20,333	12,574	—20,744	—1,417
Ulster & Delaware	Jan.	128	18,374	3,359	55,593	12,450	11,925	1,243	37,797	4,058	67,473	121.3	—11,880	—14,980	—16,090	—24,816
Union R. R. of Penna.	Jan.	45	.....	.....	697,028	70,400	163,554	161	347,435	14,461	596,011	85.5	101,017	85,017	140,953	117,313
Union Pacific	Jan.	3,765	6,762,066	1,122,380	8,575,970	680,920	1,917,452	150,677	2,597,665	340,000	5,831,029	68.0	2,744,941	2,020,064	1,912,930	1,744,345
Oregon Short Line	Jan.	2,539	2,516,265	322,852	3,049,675	316,100	466,582	50,292	920,273	134,728	1,955,170	64.1	1,094,505	807,751	749,420	519,653
Oregon-Wash. R. R. & Nav.	Jan.	2,365	1,609,792	247,795	2,049,945	295,925	359,968	73,840	872,142	132,718	1,754,579	85.6	295,366	100,881	—8,748	—172,046
Los Angeles & Salt Lake	Jan.	1,208	1,628,999	335,614	2,146,919	333,376	373,756	70,963	677,645	83,731	1,626,204	75.7	520,715	380,263	285,549	43,821
St. Joseph & Grand Island	Jan.	258	286,007	11,796	313,817	29,500	44,354	3,041	107,189	15,826	199,910	63.7	113,907	91,349	74,210	64,901
Utah	Jan.	111	266,851	.....	266,974	33,250	46,663	385	51,458	5,352	137,108	51.4	129,866	111,174	97,928	47,807
Virginian	Jan.	545	1,740,734	31,783	1,848,546	158,611	298,491	15,654	353,722	33,765	858,091	46.4	990,455	795,455	851,526	687,784
Wabash	Jan.	2,523	4,817,523	589,682	5,788,318	581,008	1,025,409	164,721	2,383,831	197,163	4,372,456	75.5	1,415,862	1,126,750	817,182	571,067
Ann Arbor	Jan.	293	436,425	18,511	467,776	47,990	94,724	13,954	202,558	12,154	371,328	79.4	96,448	68,954	47,140	29,923
Western Maryland	Jan.	875	1,416,843	25,473	1,499,623	212,277	302,323	45,973	434,016	44,183	1,042,491	69.5	457,132	377,132	407,933	437,719
Western Pacific	Jan.	1,051	1,118,783	65,723	1,263,432	180,547	245,116	62,981	504,358	46,315	1,062,432	84.1	201,000	97,493	135,852	34,268
Wheeling & Lake Erie	Jan.	511	1,488,229	26,041	1,617,183	153,684	410,938	36,737	485,198	47,906	1,135,843	70.2	481,340	341,337	318,879	161,954
Wichita Falls & Southern	Jan.	168	79,675	1,340	85,475	13,339	11,746	2,461	18,993	5,352	51,891	60.71	33,584	28,106	24,278	4,576

News of the Week

(*Continued from page 635*)

quainted and made friends with large numbers of children. The number addressed in the schools this winter has been upward of 20,000, all of whom have been made members in the Junior Safety League.

Revenues and Expenses for January

The net railway operating income of the Class 1 railroads in January amounted to $77,261,598, which for that month was at the annual rate of return of 5.59 per cent on their property investment, according to reports compiled by the Bureau of Railway Economics. In January, 1928, the net amounted to $56,562,283, or 3.74 per cent.

Operating revenues for January amounted to $487,027,229, compared with $458,208,797 in January, 1928, or an increase of 6.3 per cent. Operating expenses totaled $369,339,559, an increase of 1.5 per cent. Class I railroads in January paid $31,312,918 in taxes, an increase of $2,606,482 or 9.1 per cent over the same month last year.

Thirty Class I railroads operated at a loss in January, of which ten were in the Eastern district, two in the Southern and eighteen in the Western.

Net railway operating income by districts in January with the percentage of return on an annual basis was as follows:

New England Region	$3,147,869	6.52%
Great Lakes Region	13,788,404	6.56%
Central Eastern Region	17,231,831	6.17%
Pocahontas Region	6,846,908	9.38%
Total Eastern District	41,015,012	6.71%
Total Southern District	10,802,820	4.58%
Northwestern Region	2,804,467	3.02%
Central Western Region	15,537,492	5.60%
Southwestern Region	7,101,807	4.34%
Total Western District	25,443,766	4.76%
UNITED STATES	77,261,598	5.59%

Eastern District

The net railway operating income of the Class I railroads in the Eastern district in January was $41,015,012 at the rate of 6.71 per cent. For the same month in 1928, their net was $27,782,271 or 4.20 per cent. Operating revenues totaled $244,264,751, an increase of 8.3 per cent, while operating expenses totaled $184,536,650, an increase of 2.3 per cent.

Class I railroads in the Southern district in January had a net railway operating income of $10,802,820, at the rate of 4.58 per cent. For the same month in 1928, the net amounted to $8,672,195, which was at the rate of 3.61 per cent. Operating revenues totaled $64,888,536, an increase of 1.5 per cent, while operating expenses totaled $49,220,548, a decrease of 2.5 per cent.

Class I railroads in the Western district in January had a net railway operating income of $25,443,766, at the rate of 4.76 per cent. In January, 1928, their net was $20,107,817, at the rate of 3.29 per cent. Operating revenues totaled $177,873,942, an increase of 5.5 per cent, while operating expenses totaled $135,582,361, an increase of 1.9 per cent compared with the same month last year.

Traffic

The Allegheny Regional Advisory Board will meet at Washington, Pa., March, 21.

Oral arguments were heard by the Interstate Commerce Commission on March 7 and 8 in the cases involving constructive and off-track railroad freight stations on Manhattan Island and constructive stations and trucking in lieu of lighterage in New York City and vicinity.

The Cleveland, Cincinnati, Chicago & St. Louis, in conjunction with the Michigan Central, has established a passenger train, the Motor-Queen, between Cincinnati, Ohio, and Detroit, Mich. The train leaves Cincinnati at 11:15 p.m. and arrives in Detroit at 7:25 a. m. the next morning. Returning it leaves Detroit at 11:20 p.m. and arrives at Cincinnati at 7:20 a. m.

The Southern, in the 1929 edition of its Textile Directory, states that there are now 18,615,284 spindles in cotton mills in the cotton producing states, as compared with 16,648,762 spindles in other states; and about 75 per cent of all the spindles in the south are in towns served directly by the Southern. The increase in cotton factory facilities in the south as compared with other states has been gradual since 1922. In the year 1928 the southern mills consumed about 5,000,000 bales of cotton, or 76 per cent of the total consumption in the United States, and the southern mills were operated 64,177,998,410 spindle hours.

The Pennsylvania, in a circular which has been issued at New York, states that in the year 1928 the number of carloads of fruit and vegetables received at New York City was 69,250; of which 24,606 cars came from the west and 44,644 from the south. The total movement was 18 per cent greater than that in 1927; 50 per cent greater than in 1926 and 99 per cent greater than in 1925. These figures are exclusive of 60,000 carloads brought in by the Pennsylvania, in 1928, destined for New England, Long Island, Newark and Jersey City, and for export. The circular indicates that the company is highly pleased with the extensive and costly improvements which it has made in its New York perishable terminal facilities within the past few years.

Small Stations in New Jersey

The Public Utility Commissioners of New Jersey, acting on applications of the Pennsylvania Railroad, have approved the discontinuance of the agencies at Dayton, Titusville, Prospect Plains, and Kinkora, as from April 1. The agency at South Pemberton is to be discontinued, on condition that freight facilities shall be provided under the care of the agent at Pemberton. The principal business at South Pemberton is the shipment of sand and cranberries. The shippers of sand make no objection to the change, and for the cranberries, a clerk is to be in attendance at South Pemberton during the months when shipments are made. South Pemberton is on the Trenton division and Pemberton is seven-tenths of a mile away, by direct highway, on the Kinkora branch. The agency at Brown's Mills is to be discontinued, but the commission stipulates that an agent shall be on duty from June 1 to September 15, each year.

Sixty-three Hours to be Schedule from Chicago to Northwest

Railroads operating passenger service from Chicago to the Pacific Northwest will reduce the running time from 68 hours to 63 hours, effective in the early part of summer. Although complete details have not yet been worked out, the fast schedules will be adopted by the Chicago, Milwaukee, St. Paul & Pacific, the Chicago & North Western-Union Pacific, the Chicago, Burlington & Quincy-Great Northern and the Chicago, Burlington & Quincy-Northern Pacific. The action follows a meeting of railroad presidents, mayors and other persons at Portland, Oregon, on February 9, at which time the Pacific Northwest appealed to the railroads for a 60-hr. schedule to compete with a 61¼-hr. service from California to Chicago, and a 63-hr. schedule returning.

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The Lehigh Valley's "New Yorker" at Manhattan Transfer, N. J.

Foreign Railways

Changing a Custom 100 Years Old

Half fare tickets are now accepted on the principal railroads of Great Britain for boys and girls, up to fourteen years of age.

New "Two-class" System in Germany Eliminates Fourth Class

With the recent institution of the so-called "two-class" or second-third class system on the German Federal Railway, which included the abolishment of the fourth class entirely, a number of changes have been forthcoming in the design of passenger rolling stock.

The first step taken was the replacing of the "IV" sign with a "III" and the equipment of fourth class cars with wooden seats throughout to take the place of the wooden benches with which they were equipped. Thus they resemble the standard third class coaches. An exception will be made, however, for those third class coaches which will be designed for passengers carrying bulky packages, in which cars standing room will be available. It has been estimated that more than 9,000 of these old fourth class cars will be fitted with third class seats, fixtures and furnishings.

The preference of the public for the second or upholstered class coach over the third class, or wood-seat coach, has caused the construction of a large number of new cars of this design. At the present time 737 new cars of this type are in the course of construction. They are of a type not previously used on the German railways, being more than 20 meters long, mounted on two four-wheel trucks. An aisle runs through the center of the cars, and seats are arranged in compartment style on either side. The doors will be at either end of the car and will open to closed vestibules instead of to open ones such as existed on the former four-wheel cars.

This growing popularity of second class has caused the introduction of a custom which is proving economical to the traveler, and profitable for the company operating it. This is the so-called dining-car-class. Rather than making a journey in the crowded second or third class compartments, many passengers purchase third class tickets and travel in these diners of this class operated by the Mitropa Company. These diners are more comfortable than a third-class compartment. Dining car seats are occupied, not simply at meal hours, but during the entire trip. Except during a table d'hote meal period, the only requirement for dining-car-class travel is the purchase of a refreshment of some nature. As beverages and sandwiches of all kinds are served at moderate prices, many passengers in this manner enjoy a light repast, have comfortable furnishings, and are a few dollars ahead over the cost of a second-class ticket at the end of a four to six-hour journey.

Equipment and Supplies

Locomotives

THE MANUFACTURERS RAILWAY has ordered two heavy duty freight locomotives from the Baldwin Locomotive Works.

THE SOUTHERN PACIFIC has ordered 16 Mallet 4-8-8-2 type locomotives from the Baldwin Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of February 9.

THE PERE MARQUETTE has ordered ten eight-wheel switching locomotives from the Baldwin Locomotive Works. Inquiry for this equipment was reported in the *Railway Age* of February 16.

Freight Cars

THE SOUTHERN PACIFIC is inquiring for 300 flat cars.

THE NORTHERN PACIFIC is inquiring for 200 flat cars.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 100 underframes for ice cars.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 250 high-side steel gondola cars.

THE UNION TANK CAR COMPANY has ordered 300 tank cars from the American Car & Foundry Company.

THE CITIES SERVICE TANK LINE, New York, has ordered five tank cars of 12,000 gal. capacity from the General American Tank Car Corporation.

THE AMERICAN OIL COMPANY, Baltimore, Md., has ordered two, three-compartment tank cars of 4700 gal. capacity, and one single compartment tank car of 6000 gal. capacity, from the General American Tank Car Corporation.

Passenger Cars

THE NEW YORK CENTRAL is inquiring for 10 dining cars, 10 passenger and baggage cars, 20 baggage cars and 30 milk cars.

THE MISSOURI-KANSAS-TEXAS has ordered one steel shell for a business car, 74 ft., 8 in. long, from the American Car & Foundry Company.

THE HOCKING VALLEY is now inquiring for three all-steel mail and express cars. In the *Railway Age* of February 2 it was reported that the company contemplated buying this equipment.

THE DELAWARE & HUDSON has ordered three steel mail and baggage cars from the American Car & Foundry Company. Inquiry for this equipment was reported in the *Railway Age* of January 12.

THE NEW YORK, NEW HAVEN & HARTFORD at a recent meeting of its board of directors authorized an expenditure of $6,500,000 for new passenger equipment to consist of steel cars of the most modern de luxe type, equipped with roller bearings. The new cars will include:

90	coaches
10	combination coaches
15	apartment mail cars
6	dining cars
20	gasoline-electric cars
24	trailer cars for gasoline-electric cars
3	multiple-unit motor cars
6	multiple-unit trailer cars

It is planned to place the new de luxe equipment in service on important through trains. The multiple-unit cars are for use in the New York suburban zone.

Machinery and Tools

THE NORTHERN PACIFIC has ordered a 25-ton overhead electric crane from the Shaw Electric Crane Works.

Signaling

THE PENNSYLVANIA is to install car retarders in one of its three large yards near Pittsburgh.

THE ST. LOUIS-SAN FRANCISCO has ordered from the Union Switch & Signal Company material for the installation of automatic block signals on its line between Bristow, Okla., and Oklahoma City, 82 miles, single track. The order includes 142 one-arm semaphore signals, style S. 400 relays and other material.

THE CANADIAN PACIFIC has ordered from the Union Switch & Signal Company, material for the installation of automatic block signals on its lines in Ontario, single track, aggregating 176 miles in length. The sections to be signaled are from Woodstock to London, 27 miles; St. Martin to Lanoraie, 35 miles, Vaudreuil to Mando, 18 miles and Trenton to Agincourt, 96 miles. The order includes 425 searchlight signals, 1100 relays and other material.

THE 1928 APPLE MOVEMENT from eastern Washington over the Great Northern has broken all previous records, the total shipments from the Wenatchee valley up to March 1 amounting to 20,252 cars, compared with 14,456 for the same period a year ago. It is estimated that 2,100 cars remain to be shipped.

Supply Trade

E. W. McHenry has been appointed district sales representative at Houston, Texas, of the **Reading Iron Company,** Reading, Pa.

K. G. Baker, formerly connected with the Century Electric Company, has been appointed representative of the **Wagner Electric Corporation.**

The New York office of the **Handlan-Buck Manufacturing Company** will be located after March 21 in the New York Central building, New York City.

Lamar S. Peregoy, vice-president and secretary of the **Sivyer Steel Castings Company,** Milwaukee, Wis., has also been appointed general manager.

R. A. Cannon, manager of casting sales, **Birdsboro Steel Foundry & Machine Company,** Birdsboro, Pa., has been appointed vice-president in connection with his present office.

Joseph M. Hall, formerly of the Universal Draft Gear Attachment Company, has been appointed mechanical engineer of the **Union Draft Gear Company,** with headquarters at Chicago.

Fred L. A. Schmidt, industrial power plant specialist in the Cleveland district office of the **General Electric Company** for the past 12 years, resigned on March 1 to take a position on the power plant engineering staff of the **H. K. Ferguson Company,** Hanna building, Cleveland, Ohio.

The Bucyrus-Erie Company, South Milwaukee, Wis., has moved its Chicago district office to 105 West Adams street, Chicago. The company's complete line will be handled by **A. R. Hance** for machines larger than one and one-quarter yards capacity and by **W. K. Fawcett** for the smaller machines.

The P. H. Mallory Company, Indianapolis, Ind., has purchased the Indianapolis factory of the National Lamp Company division of the General Electric Company and will manufacture carboloy, an extremely hard metal used for cutting purposes, which has been developed in the General Electric Company laboratories.

George E. Howard, vice-president and sales manager of the **Commonwealth Steel Company,** Granite City, Ill., has relinquished the duties of sales manager but will continue his active association with the company as vice-president and a director. **Harrison Hoblitzelle,** vice-president in charge of purchases, has been appointed vice-president and manager of sales.

The Chicago Mill & Lumber Corporation has started work on a plant at Greenville, Miss., in which it will manufacture insulating board for use in the construction of refrigerator cabinets, refrigeration cars and other places where a non-conductor of heat and cold is demanded. **Walter P. Paepcke** is president of the corporation; **O'Neill Ryan,** sales manager, was formerly assistant general manager of the Celotex organization and **George W. Powers,** in charge of production, was formerly with the Insulite Corporation. Sales headquarters will be maintained in the Conway building, Chicago.

The Baldwin Locomotive Works, Philadelphia, Pa., has purchased a substantial interest in the business of the **Geo. D. Whitcomb Company,** Rochelle, Ill. The Whitcomb company is now building straight gear driven machines powered by gasoline, distillate and oil engines, in sizes up to 50 tons, developing draw bar pulls in low gear, up to 25,000 lb., and has now developed gas and oil-electric locomotives up to 100-ton sizes, and can furnish the railways locomotives with a maximum draw bar pull of 50,000 lb. The Baldwin Locomotive Works will sell the Whitcomb locomotives and products in foreign countries through its own representatives, located in all parts of the world and will handle the railway field in the United States.

The Bird-Archer Company, Chicago, has made the following promotions in its organization: **P. B. Bird,** president, has been elected chairman of the board of directors, with office at 1 East Forty-second street, New York, he will continue actively in charge of policy and finance; **L. F. Wilson,** vice-president and general manager, has been elected president and general manager, in charge of the company's operations generally, with office at Chicago; **W. E. Ridenour** has been elected executive vice-president with office at Philadelphia, Pa., his duties to include those of chief chemist as heretofore; **C. A. Bird** has been elected secretary with office at New York; **H. C. Harragin** has been appointed district manager with office at New York, in charge of operations in the eastern section of the United States, reporting to the general manager; **T. A. Peacock** has been appointed district manager with office at Winnipeg, Manitoba, in charge of operations throughout Canada, reporting to the general manager; **S. P. Foster** has been appointed assistant to the president with office at Chicago and combines the duties of chemical engineer with the duties of assistant to the president.

Consolidation of the **Square D Company,** Detroit, Mich., and the **Industrial Controller Company,** Milwaukee, Wis., manufacturers of electrical safety devices, has been approved by the two companies while the physical details of the merger are still being completed. The company will operate and be known as the **Industrial Controller Division of the Square D Company. T. J. Kauffman** is to head the consolidated company as president; **F. W. Magin, Carlton Higbie** and **W. L. Mercer** will be vice-presidents and **W. C. Worcester,** secretary and treasurer. Both companies are constructing additions to their present plants to facilitate the handling of additional business.

At a recent meeting of the board of directors of the **American Steel Foundries, Colonel R. F. Lamont** and **James F. Curtis** resigned as directors and **Chauncey Belnap** and **Thomas Drever** were elected to fill the vacancies. Colonel Lamont also resigned as president to become Secretary of Commerce of the United States and **George E. Scott,** vice-president, was elected president as announced in the *Railway Age* of March 9; **R. H. Ripley,** vice-president was elected senior vice-president and **Thomas Drever** was elected secretary and treasurer. The board also authorized the issuance of 90,275 shares of the common stock of the company, authorized but unissued, and the offer of such additional stock pro rata to the holders of record on March 18, 1929, of the present outstanding common stock. Holders of such stock may subscribe to the additional shares at $40 a share, and have the right to take one share of the additional stock for each ten shares of outstanding stock held by them.

Obituary

Theodore Frelinghuysen Merseles, president of the Johns-Manville Corporation, New York, died suddenly on March 6, while on a visit at Del Monte, Cal. Mr. Merseles was born at Jersey City, N. J., on August 17, 1863, and was educated in the public and private schools. He began work in 1881 as a clerk with the Pennsylvania at Jersey City, and later became a clerk for the Trunk Line Association at New York, where he remained until 1893. He then became manager and vice-president of the Western Wheel Works at Chicago

Theodore Frelinghuysen Merseles

and in 1899 he helped organize the American Bicycle Company of New York and was its vice-president. In 1903 he became vice-president and general manager of the National Cloak & Suit Company, a mail order house, at New York; he left that organization in 1921 to become president of Montgomery Ward & Co., and since June, 1927 he had been president of the Johns-Manville Corporation.

Benjamin A. Hegeman, Jr., president of the National Railway Appliance Company, New York, who died on March 6, was born in New York on July 14, 1860. He attended the public schools of his native city and was graduated from the Mount Washington Collegiate Institute in 1877. He began railway work in 1878 with the Delaware, Lackawanna & Western where he served for about eight years in the freight, passenger and treasurer's offices. He was subsequently general manager of the Lackawanna Live Stock Transportation Company for 11 years. He then entered the railway supply business as eastern sales agent for the American Car & Foundry Company, and in 1901 was elected president of the United States Metal & Manufacturing Company where he served for 16 years and then became president of the National Railway Appliance Company, which was organized in 1917 to sell railway supplies and to take over the entire railroad department business of the United States Metal & Manufacturing Company. At the time of his death, he was also president of the Hegeman-Castle Corporation of Chicago; the Anglo-American Varnish Company, Newark, N. J., and of the Genesco Corporation, Rochester, N. Y. In 1914 Mr. Hegeman was president of the Railway Supply Manufacturers' Association.

Benjamin A. Hegeman, Jr.

American Steel Foundries

The annual report for 1928 shows net income for the year of $3,256,072, as compared with $4,076,093 in 1927. The surplus account as of December 31, 1927, which totaled $13,748,838, was increased, after adding the net income, to a total of $17,004,911, but after deducting preferred stock dividends, amounting to $532,455, common stock dividends amounting to $2,708,235, the loss from the sale of investment amounting to $642,500 and the premium on 22,130 shares of preferred stock retired, amounting to $221,300, the surplus decreased to $12,900,421. Assets totaled $53,378,529 of which current assets amounted to $19,802,996 and real estate, buildings, plants and good will after deducting depreciation, $32,509,370. The condensed income statement with comparisons with 1927 follows:

	1928	1927
Earnings from operations, after deducting manufacturing, selling and administrative expense and federal taxes	$3,806,712	$4,483,654
Deduct		
Depreciation	1,104,604	935,319
Net profit from operations	$2,702,108	$3,548,334
Add—Miscellaneous Income:		
Interest, discount and exchange, etc.	205,840	186,827
Income from investments.	370,374	366,565
Total Profit on Income.	$3,278,322	$4,101,727
Deduct		
Net earnings of subsidiary company appertaining to outstanding minority stockholdings	22,250	25,663
Net income carried to surplus	$3,256,072	$4,076,093

R. P. Lamont, president, in his statement to stockholders said in part:

> The number of freight cars bought was smaller in 1927 and the smallest—with two exceptions—in 28 years. The locomotive business was even worse. The number bought was the smallest on our records. In short, the conditions which have existed in the railway equipment industry for the last five years or more continued through another year and brought the average figures for the period to still lower levels.
>
> Nevertheless, as has been true ever since they were returned to their owners after the war, the railroads have satisfactorily handled a large volume of traffic without complaints of delays or shortages of equipment. It is noted, however, that at the period of peak loading of freight cars last fall the surplus was smaller than for several years past and may have reached a point beyond which it probably may not be safe to go.
>
> The total net tonnage shipped during 1928 was 459,564, compared with 509,862 in 1927; 553,826 in 1926 and 638,843 in 1925. The profit per ton was $7.09; in 1927, $7.99.
>
> The net additions to property for the year were $706,139. The provision for depreciation was $1,104,603, compared with $935,319 in 1927. The amount spent for maintenance and repairs and charged to operating costs was $1,943,754.
>
> Toward the end of the year it was decided that it was advisable to build a plant for the manufacture of large castings for the eastern territory. Ground was broken late in December at Eddystone, Pa.—a short distance from Philadelphia—and it is hoped to have the plant completed and operating before the end of the present year. A separate company—General Steel Castings Corporation—has been organized, in which Baldwin Locomotive Works and the American Locomotive Company have substantial interests. In view of the narrow market for our products in recent years, the question might be raised as to the necessity for a new plant, but the fact is that in spite of the steadily decreasing purchases of our standard products, there has been an increasing demand for large, rangy, heavy castings for the manufacture of which none of our present plants is adequate.

Timken Roller Bearing Company

The annual report for the year ending December 31, 1928, shows a net profit of $13,730,145 after all expenses, as compared with $9,554,397 in 1927. Manufacturing profit totalled $15,814,525, after subtracting all manufacturing costs, including materials, labor, factory expense and depreciation in the amount of $1,190,974. This compares with a manufacturing profit of $14,077,519 in 1927. Dividends paid during the year amounted to $6,304,630 as compared with $6,004,410 in 1927 while the surplus increased from $25,679,340 in 1927 to $33,515,397 in 1928.

The income account for the year ending December 31, 1928, follows:

	1928	1927
Manufacturing profit, after deducting cost of goods sold, including materials, labor, factory expense and depreciation in the amount of $1,190,974.	$19,187,215	$14,995,892
Selling, administrative and general expenses	3,372,690	3,211,870
Operating profit	$15,814,525	$11,784,022
Other income	.....	722,197
Total Income	$15,814,525	$12,506,219
Extraordinary charges covering: obsolescence of plant property	460,791	918,301
Extraordinary write-offs	.....	667,140
Provision for contingencies	400,000	.....
Other deductions—Net exclusive of interest earned and federal taxes	148,396	66,381
Profit before interest earned and federal taxes	$14,805,338	$10,854,397
Interest earned	774,807	.....
Profit before federal taxes	$15,580,145	$10,854,397
Provision for estimated federal taxes	1,850,000	1,300,000
Net profit	$13,730,145	$ 9,554,397

During the year approximately $8,300,000 was expended in the expansion and improvement of steel mills, tube mills and bearing factories while the company expects to spend a further sum of $4,500,000 in 1929 to provide adequate capacity for increasing demands.

Part of President H. H. Timken's statement to stockholders refers to the railroad sales as follows:

One hundred and sixteen railroads are new using Timken bearings on passenger cars, Pullman cars, freight cars, locomotive tenders, gasoline electric coaches and gasoline mechanical coaches. In addition, 26 electric railways are operating cars equipped with Timken bearings. Many of these companies are still testing and experimenting with Timken-equipped rolling stock, but 32 per cent of all railroad passenger car equipment built during 1928 was equipped with roller bearings of various types.

Some of the Timken-equipped passenger cars which the Chicago, Milwaukee, St. Paul & Pacific put into service early in 1927 have operated satisfactorily more than 400,000 miles. This railroad during 1928 placed several additional orders for Timken-equipped cars. During 1928, the Pennsylvania added 95 main line coaches and 21 dining cars equipped with Timken bearings, making a total of 191 cars so equipped in service on this railroad.

Trade Publication

AIR COMPRESSORS.—Duplex air compressors for single stage or two-stage compression are illustrated and described in Bulletin No. 144 issued by the Pennsylvania Pump & Compressor Company, Easton, Pa. Advantages of synchronous motor drive are pointed out in this bulletin.

Construction

ATCHISON, TOPEKA & SANTA FE.—A contract for the construction of a steel car shed at Richmond, Cal., which will have outside dimensions of 75 ft. by 800 ft. has been let to the Clinton Construction Company, San Francisco, Cal.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—A contract has been let to the Ellington Miller Company, Chicago, for the construction of terminal improvements at Linndale (Cleveland), Ohio, which include a roundhouse, a storehouse, an office building, a shop building and cinder pits. This project involves an expenditure of approximately $200,000.

CHICAGO, ROCK ISLAND & PACIFIC. — This company plans to file with the Interstate Commerce Commission an application for permission to construct an extension from Groom, Tex., to Paducah, 97 miles.

ERIE.—This company will receive bids until March 18, for the construction of a freight house and team track yard on its lines at Black Rock, N. Y., north of Buffalo. A contract has been let to the Curtis-Harper Company, Newburgh, N. Y., for the construction of a lateral highway to eliminate a grade crossing on its lines at Campbell Hall, N. Y.

ERIE.—A number of extensive construction projects have been announced by this road in connection with the recent approval of its budget plan for the present year. Among those recently made public are the following: Re-arrangement of water lines, the construction of a new sewerage system and the installation of a new main track coaling station in Meadville, Pa., to cost approximately $443,000; extensions and improvements to car shops at Susquehanna, Pa., to include rebuilding several existing units and the construction of additional buildings to cost, with equipment, about $378,000; construction of additional yard facilities at Shenango, Pa., to handle interchange business with the Bessemer & Lake Erie, at an estimated cost of $90,000; the installation of a new turntable, costing $50,000 at Ferrona, Pa., this turntable to be 120 ft. long and constructed to handle the largest type of locomotive now in use; and the addition of two yard tracks at the west end of the Ferrona yards to make doubling unnecessary, to cost about $25,000.

LOUISVILLE & NASHVILLE.—Contracts have been awarded and work has been started on this road's new warehouse at Pensacola, Fla. The building will be built on the road's present water front properties. It will be 102 ft. by 402 ft. in dimensions and will have, when completed, storage space for 25,000 tons or 1,250 carloads of freight. This is a part of the $500,000 improvement project which this road has planned for its dock and storage facilities at Pensacola.

NEW YORK CENTRAL.—This road has submitted plans to the New York Public Service Commission for the elimination of two grade crossings on its lines south of Schenectady, N. Y., estimated to cost $203,000. A further hearing on the project will be held by the commission on April 12.

NEW YORK CENTRAL.—This company has awarded three contracts as follows: To the Union Iron Works, Erie, Penn., for manufacture and delivery of three boilers for its boiler house at Pier 7, West New York, N. J.; to the Culsher Contracting Company, Inc., New York, for partial re-construction of two bridges on its lines at Port Morris, New York City; and to H. H. Sherwin & Company, New York, for the reconstruction of bridge H-33, carrying Tremont avenue, New York City.

NEW YORK, NEW HAVEN & HARTFORD.—This company has awarded a contract to the Wilbur G. Hudson Corporation, New York, for the construction of coal storage facilities on its lines at Allyn's Point, Conn., to cost approximately $37,000.

PENNSYLVANIA.—This company will receive bids until about March 27 for the construction of a modern 20-story office building, to be built between Sixteenth and Seventeenth streets in Philadelphia, Pa. The architects are Graham, Anderson, Probst & White, Chicago.

PENNSYLVANIA. — This company has awarded a contract to the Dravo Contracting Company, Pittsburgh, Pa., for the construction of masonry for the renewal of a bridge on its line over the Tuscarawas river near Gnadenhutten, O., at a cost of about $130,000. A contract also has been awarded to the McNichol Paving & Construction Company, Philadelphia, Pa., for the construction of bridges over four streets, and the building of a retaining wall between Vare avenue and Passayunk avenue in Philadelphia in connection with the South Philadelphia improvement program. This work will cost approximately $300,000.

PHOENIX UTILITY COMPANY.—A contract has been let by this company, which is located at Little Rock, Ark., to W. P. McGeorge, Pine Bluff, Ark., for the construction of a line five and one half miles in length from a connection with the Missouri Pacific to the site of the Ouachita river dam near Little Rock.

PUBLIC SERVICE CO-ORDINATED TRANSPORT (New Jersey)—The Board of Public Utility Commissioners of New Jersey has approved a contract between this company and the city of Newark, calling for the construction of a rapid transit railway line in the bed of the abandoned Morris canal.

TOLEDO TERMINAL.—A contract for the construction of a double track movable bridge over the Maumee river at Toledo, Ohio, has been let to the American Bridge Company, Chicago, at a cost of about $1,000,000.

Financial

BALTIMORE & OHIO. — *Control of the Buffalo, Rochester & Pittsburgh.*—This company has sold to the Van Sweringen interests its holdings of Wheeling & Lake Erie stock, both preferred and common, aggregating about 17 per cent of the stock of that company and has purchased from the Van Sweringen interests, subject to the approval of the Interstate Commerce Commission, their stock holdings in the Buffalo, Rochester & Pittsburgh. This is one of the properties which in its recent application to the Commission the Baltimore & Ohio sought authority to control.

BOSTON & MAINE.—*Dividend.*—This road, on March 13, declared a quarterly dividend of $1.50 on its 6 per cent noncumulative preferred stock. This is the first dividend which holders of these securities have received since 1920 and the payment in 1920 was the first since 1913. Dividends were also declared on other preferred shares of the road.

CANTON & CARTHAGE. — *Trackage Rights.*—The Interstate Commerce Commission has authorized this company to operate under trackage rights over the lines of the Pearl River Valley Lumber Company and the Marietta Lumber Company from River Junction to Pelahatchie, a distance of 23.5 miles, and from Carthage to Burnside, a distance of 29 miles, all in the state of Mississippi.

CHICAGO GREAT WESTERN — *Promissory Notes*—This company has been granted permission by the Interstate Commerce Commission to issue promissory notes aggregating $3,186,616.98 to the order of the Pullman Car & Manufacturing Corporation and to be delivered to that company in payment for equipment.

FAIRCHILD & NORTH-EASTERN.—*Abandonment.*—This company has applied to the Interstate Commerce Commission for authority to abandon its line, from Fairchild to Greenwood, Wis., 23.52 miles.

IDAHO PACIFIC. — *Charter Granted.* — This company has been incorporated in the state of Oregon for the purpose of constructing a railroad from Nyssa, Ore., (a point on the Union Pacific) southward to Winnemucca, Nev. (served by the Western Pacific and the Southern Pacific). The incorporators are John Leeds Kerr, Robert Phillips and Guy C. H. Corliss.

LOUISIANA & ARKANSAS.—*Acquisition of Control.*—This company, organized under the laws of Delaware, has been authorized by the Interstate Commerce Commission, to acquire control of the Louisiana & Arkansas Railway Company of Arkansas and of the Louisiana Railway & Navigation Company. The order also authorizes control, by the latter, of the Angola Transfer Company. To execute the acquisition authority is granted to issue $12,000,000 of first-mortgage 5

per cent bonds, $4,000,000 in second-mortgage 5½ per cent bonds, $5,000,000 in non-cumulative 6 per cent preferred stock of $50 par value and not exceeding 100,000 shares of common stock without par value. The parent company is further authorized to assume outstanding obligations of the Louisiana & Arkansas Railway Company of Arkansas and of the Louisiana Railway & Navigation Company.

MICHIGAN CENTRAL.—*Dividend Declared.*—This road on March 13 declared an extra dividend of 100 per cent on its common stock. This is the largest single distribution it has ever made. The New York Central, which owns 99 per cent of the Michigan Central's outstanding capital stock, will receive $18,584,000, or the equivalent of $4 a share on its own stock on account of this disbursement.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—*Abandonment.*—This company has been authorized by the Interstate Commerce Commission to abandon its Middle Tennessee and Alabama branch line from Fayetteville, Tenn., to Capshaw, Ala., a distance of 36.9 miles.

NORFOLK & WESTERN.—*Sewall's Point Terminals.*—The Norfolk & Western has agreed with the City Port Commission, of Norfolk, Va., on a lease of the terminal property of the City, under which the railroad company will operate the terminals from May 1, 1929, to May 1, 1952; at the end of which period the payments under the lease will have provided for the transfer of the property to the railroad company in fee simple.

These terminals, at Sewall's Point, include piers, a grain elevator and 300 acres of land. The completion of the agreement between the railroad and the city will await approval by the Interstate Commerce Commission. By this transaction, the railroad company relieves the city of Norfolk of an annual interest charge, on the bonds which were issued for the development of the terminals, amounting to $380,000.

SOUTHERN PACIFIC.—*Construction Authorized.*—This company has been authorized by the Interstate Commerce Commission to construct a branch line from Knights Landing to Boyers Landing, Cal., a distance of 13.8 miles.

SOUTHERN PACIFIC.—*Securities.*—This road, subject to the approval of the Interstate Commerce Commission, will offer to its shareholders an issue of $65,166,000 of 4½ per cent bonds. Each $1,000 bond will have a non-detachable warrant entitling the owner to purchase up to May 1, 1934, three shares of the company's common stock at $145 a share. The bonds which will mature on May 1, 1969, will be callable on May 1, 1934, or on any semi-annual interest date to May 1, 1964, at 105, with the premium thereafter amounting to ½ per cent for each six months to date of maturity. These bonds are to be offered to stockholders in the ratio of 17½ per cent of their stock holdings on April 8, at a price of 94, to yield 4.85 per cent. Kuhn, Loeb & Co., New York, has underwritten the issue, the proceeds of which will be used to redeem $53,815,760 of the company's 4 per cent convertible bonds due on June 1 and for other corporate purposes.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS.—*Bonds.*—This company has been authorized by the Interstate Commerce Commission to procure the authentication and delivery of $7,000,000 of its refunding and improvement 4½ per cent mortgage bonds, the proceeds to be used to reimburse its treasury for capital expenditures previously made.

TEXAS & PACIFIC—*Bonds.*—This company has applied to the Interstate Commerce Commission for authority for the authentication and delivery of $34,000,000 of general and refunding mortgage 5 per cent gold bonds, Series C, to sell $20,000,000 of bonds to Kuhn, Loeb & Co., at 96¾ and interest, and to pledge $14,000,000 of the bonds from time to time.

Dividends Declared

Beech Creek.—½ per cent, quarterly, payable April 1 to holders of record March 15a.

Kansas City Southern.—Preferred, $1.00, quarterly, payable April 15 to holders of record March 30.

Lehigh Valley.—Common, $.87½, quarterly; Preferred, $1.25, quarterly; both payable April 1 to holders of record March 16.

Old Colony.—1¾ per cent, quarterly, payable April 1 to holders of record March 16.

Pittsburgh, Fort Wayne & Chicago.—Common, 1¾ per cent, quarterly, payable April 1 to holders of record March 9a; Preferred, 1¾ per cent, quarterly, payable April 2 to holders of record March 9a.

St. Joseph, South Bend & South.—Common, ½ per cent; Preferred, 2½ per cent, both payable March 15 to holders of record March 11 to May 14.

Southern.—Common, 2 per cent, quarterly, payable May 1 to holders of record April 1; Preferred, 1¾ per cent, quarterly, payable April 15 to holders of record March 19.

West Jersey & Seashore.—1¾ per cent, payable April 1 to holders of record March 15.

Average Prices of Stocks and of Bonds

	Mar. 12	Last week	Last year
Average price of 20 representative railway stocks.	132.33	135.74	117.61
Average price of 20 representative railway bonds..	90.76	91.24	96.95

APPLICATIONS for appointments to the positions of research graduate assistantships at the Engineering Experiment Station of the University of Illinois, Urbana, Ill., will be received by the Director of the Station up until April 1, 1929, when nominations, effective September 1, will be made by the Executive Staff. These assistantships, maintained by the University of Illinois to assist in the conduct of engineering research and to extend and strengthen the field of its graduate work in engineering, are open to graduates of approved American and foreign universities and technical schools who are prepared to undertake graduate study in engineering, physics, or applied chemistry. For each of the assistantships there is an annual stipend of $600 and freedom from all fees, except the matriculation and diploma fees.

Officers

Executive

R. F. Spencer has been elected president of the Fredericksburg & Northern, with headquarters at San Antonio, Tex., succeeding **J. L. Browne,** resigned.

John R. Baker of the traffic department of Armour & Co., Chicago, has been appointed vice-president and general manager of the Oklahoma City Junction, with headquarters at Oklahoma City, Okla., effective April 1.

W. M. Gibbs, vice-president and general manager of the Shreveport, Houston & Gulf, has been elected president, with headquarters as before at Manning, Tex. **W. B. Faris,** auditor and traffic manager, with headquarters at Manning, has also been elected vice-president.

Financial, Legal and Accounting

V. N. Wahlberg has been appointed assistant general auditor of the Great Northern, with headquarters at St. Paul, Minn.

Harry R. Jones has been appointed commerce attorney of the Missouri Pacific lines, with headquarters at Houston, Tex.

E. J. Gibbs has been elected treasurer of the Shreveport, Houston & Gulf, with headquarters at Manning, Tex., succeeding **W. W. Kelley.**

H. A. Fett has been appointed auditor of capital expenditures of the Wabash, with headquarters at St. Louis, Mo.

W. R. Sherman has been appointed general claim agent, with headquarters at Portland, and will also have supervision over the medical department.

W. C. Smith, who has been general claim and tax agent of the Spokane, Portland & Seattle, with headquarters at Portland, Ore., will devote his entire time to taxation matters as general tax agent.

G. P. Tyer, assistant paymaster of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., has been promoted to paymaster, with headquarters at the same point, succeeding **C. B. Glenn,** deceased.

G. B. Perkins, auditor of the St. Louis-San Francisco, has been promoted to general auditor, with headquarters as before at St. Louis, Mo. The title of **C. B. Rex,** assistant auditor at St. Louis, has been changed to assistant to the comptroller in charge of personnel.

E. M. Shelton, assistant to the general counsel of the Chicago, Burlington &

Quincy, has been promoted to assistant general counsel, with headquarters as before at Chicago. **J. A. Connell,** attorney for the Illinois district and tax commissioner, has been promoted to general attorney and tax commissioner with headquarters at Chicago.

E. E. Rusch, assistant auditor of disbursements of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., has been promoted to auditor of disbursements, with headquarters at the same point. **E. J. Rathmann** has been appointed assistant auditor of disbursements, succeeding Mr. Rusch.

A. B. Johnson, land and tax agent of the Erie, with headquarters at New York, has been promoted to general land and tax agent, with headquarters at Cleveland, Ohio, where the general offices of the land and tax department have been moved from New York. **J. A. Minor,** general land and tax agent, has been appointed assistant land and tax agent, with headquarters as before at New York.

Operating

A. F. McSweeney has been appointed acting superintendent of freight transportation of the Western region of the Pennsylvania, with headquarters at Chicago.

C. E. Lees has been appointed general manager of the Parral & Durango, with headquarters at Parral, Chih.

Paul K. Partee, terminal trainmaster of the Baltimore & Ohio at Parkersburg, W. Va., has been appointed assistant superintendent of the Baltimore division, with headquarters at Baltimore, Md.

John M. Flanigan who has retired from active duty as superintendent of terminals of the St. Louis-San Francisco at Kansas City, Mo., has been in railway service for more than 50 years, nearly 41 of which were with the Frisco. He was born at New York on December 26, 1857, and entered railway service in 1878 as a brakeman on the Chicago & Alton. For the following nine years Mr. Flanigan served as a brakeman on that road, on the Chicago, Burlington & Quincy and on the Wabash and on March 3, 1887, he became a switchman on the Frisco. The next year he was advanced to switch foreman at Kansas City, then being further advanced to assistant yardmaster on December 12, 1888. On November 1, 1895, he was promoted to general yard master and nine years later he was again promoted to trainmaster on the Kansas City Terminal. Mr. Flanigan was promoted to superintendent of the Kansas City terminals of the Frisco on May 1, 1911, a position he held until his retirement under the pension rules of the company on February 14.

Charles T. O'Neal, who has been appointed general manager in charge of operation and maintenance of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., was born at Brandywine Springs, Del., and was educated in the Wilmington, Del., public schools and Goldys Business College. He entered the service of the Philadelphia & Reading in 1890 as a clerk. From 1891 to 1903 he served in various capacities with the Lehigh Valley and from the latter date until 1904 he was trainmaster of the Pennsylvania division of the same road. In 1905 he was appointed trainmaster of the New Jersey and Lehigh division, and the following year he was appointed superintendent of the New York division. From 1908 to 1916, he served as superintendent of the Buffalo division of the

Charles T. O'Neal

same road and also of the Lehigh Transportation Company. In 1917 and 1918 he was general superintendent, assistant vice-president and marine manager of the Lehigh Valley. In 1919 he served with the United States Railroad Administration as manager of terminals of the various roads running into the Niagara frontier and in 1920 he went to Washington, D. C., as a member of the Railway Board of Adjustment, Division of Labor, United States Railroad Administration, and as assistant to the director general of railroads in settlement of claims arising during Federal control. He was appointed receiver of the Fort Smith & Western in 1921, and in 1923 he was promoted to vice-president of that road, with headquarters at Fort Smith, Ark., which position he held until his recent promotion.

Traffic

O. D. Chalmers has been appointed manager of mail and express traffic of the St. Louis-San Francisco, with headquarters at St. Louis, Mo.

H. A. Buck, district passenger agent on the Union Pacific at San Francisco, Cal., has been promoted to general agent of the passenger department at the same point.

M. R. Johnson, city passenger agent for the Northern Pacific at St. Paul, Minn., has been promoted to general agent of the passenger department at that point.

C. W. Wiley has been appointed freight traffic agent of the Atlanta, Birmingham & Coast, with headquarters at Atlanta, Ga., to succeed W. W. McGee, who has resigned.

Claude H. Pugh, assistant general freight agent of the Missouri Pacific Lines, has been promoted to general freight agent, with headquarters as before at Houston, Tex.

S. R. Carson has been appointed general agent for the Atlanta, Birmingham & Coast with headquarters at Birmingham, Ala., to succeed **L. G. Scarboro,** who has resigned to engage in other business.

F. Miranda has been appointed general agent in the freight department of the Missouri Pacific Lines at Mexico City, Mex. **E. Ibarra** has been appointed assistant general agent in the freight department at Mexico City.

James M. Duncan, assistant secretary of the Alton & Eastern, with headquarters at Edwardsville, Ill., has been appointed assistant traffic manager of that railroad and the Litchfield & Madison, with headquarters at St. Louis, Mo.

E. E. Kester, assistant traffic manager of the electrified lines of the Illinois Terminal Company, with headquarters at Springfield, Ill., has been promoted to passenger traffic manager of the Illinois Terminal System, with headquarters as before at Springfield.

Thomas Richard Dester has been appointed general passenger traffic agent in the United States and Canada for the London Midland & Scottish (Great Britain and Ireland) with headquarters at New York, to succeed John Fairman, recently pensioned.

H. A. Eberhart, chief of the tariff bureau of the Wheeling & Lake Erie, has been promoted to assistant general freight agent in charge of tariffs, with headquarters as before at Cleveland, Ohio. The position of chief of the tariff bureau has been abolished.

Harry Willis, city passenger agent for the Chicago, Indianapolis & Louisville at Chicago, has been promoted to general agent of the passenger department at that point, succeeding **Herbert Wiley,** deceased. **Frank G. Cronin,** commercial agent at Chicago, has been promoted to general agent at Cincinnati, Ohio.

Carlos J. McDonald, who has been promoted to mail and express traffic manager of the Pacific lines of the Southern Pacific, with headquarters at San Francisco, Cal., has been connected with that railway for 23 years. He was born in Monterey, Cal., and entered Southern Pacific service in 1904 as a stenographer and clerk on the Dallas

division of what are now the Texas and Louisiana lines of the S. P. During the following 10 years Mr. McDonald was advanced successively through various positions in the offices of the general superintendent, the division superintendent and the general manager and in 1914 he was promoted to assistant superintendent of transportation of the Pacific lines, with headquarters at San Francisco. In 1917 he was appointed assistant to the president, serving on the Railway War Board, then during the

Carlos J. McDonald

period when the railroads were under federal control he acted as assistant to the district director and assistant to the regional director of the United States Railroad Administration. Following the return of the railroads to private operation he was appointed manager of perishable freight traffic, with headquarters at San Francisco, a position he held until his promotion to manager of mail and express traffic.

Engineering, Maintenance of Way and Signaling

Chester K. Smith, assistant engineer on the Union Pacific at Omaha, Neb., has been appointed special representative to the president, with headquarters at the same point.

F. R. Rex, supervisor of the Eastern division of the Central region of the Pennsylvania, with headquarters at Alliance, O., has been appointed division engineer of the Sunbury division.

Henry L. Restall, who has been appointed assistant valuation engineer of the Boston & Maine, with headquarters at Boston, Mass., was born on August 9, 1894, at Everett, Mass. He was educated at Northeastern University and Suffolk Law School and entered the service of the Boston & Maine in 1912, in the engineering department. He later served in the valuation department of the same road and during 1916 and 1917 he was assistant engineer of the Atlantic Coast Line. Mr. Restall served with the American Expeditionary Forces during the World War, returning to the Boston & Maine in 1919, where he served in various positions in the valuation department until his recent appointment as assistant valuation engineer, in charge of and responsible for compliance with Valuation Order No. 3 and future orders of the Commission relative thereto.

Purchases and Stores

R. T. Huson, roadmaster on the Kansas City Southern at Leesville, La., has been appointed tie and timber agent, with headquarters at Kansas City, Mo., succeeding **I. V. Bowden,** deceased.

J. L. Nichols has been appointed stationery storekeeper of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Beech Grove, Ind., succeeding **W. A. Saffell,** who has been assigned to other duties.

Mechanical

S. R. Mauldin, master mechanic on the Illinois Central at Clinton, Ill., has been transferred to Jackson, Tenn., succeeding **Lloyd Grimes,** deceased.

John Peter Laux, who has been appointed superintendent of motive power of the Lehigh Valley, with offices at Bethlehem, Pa., was born July 17, 1882, at Pittston, Pa., receiving his education in the high school there, also attending mechanical school and completing mechanical courses with a correspondence school. He entered the service of the Lehigh Valley on September 10, 1897, at Sayre, Pa., as crew caller, serving with the same road until 1904 as crew dispatcher, machinist apprentice and assistant engine house foreman. From 1904 to 1908 he was assistant foreman of the Tennessee Coal & Iron Company at Knoxville, Tenn., leaving this position in 1908 to become assistant enginehouse foreman of the Southern at Knoxville. In 1909 he became air brake inspector for the New York, New Haven & Hartford, at Hartford, Conn., in the same year returning to the Lehigh Valley as enginehouse foreman at Sayre, Pa. Since that date he has served with the same road consecutively as general foreman at Manchester, Pa., assistant master mechanice at South Easton and master mechanic at Hazleton, master mechanic at Sayre, and master mechanic at South Easton in 1918. In June, 1923, he became superintendent of the system shops of the road at Sayre, Pa., in which capacity he served until his recent appointment as superintendent of motive power, with offices at Bethlehem, Pa.

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Obituary

Rufus W. Magett, trainmaster on the Trans-Missouri division of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Miles City, Mont., died in that city on February 5.

Thomas H. Yorke, master mechanic of the Third division of the Oregon-Washington Railroad & Navigation Company, with headquarters at Spokane, Wash., died at his home in that city on February 24.

St. Dennis J. DeBlanc, assistant secretary and assistant treasurer of the Southern Pacific Lines in Texas and Louisiana, with headquarters at New Orleans, La., died in that city on March 3 from a heart attack, at the age of 50 years. Mr. DeBlanc was a director of the Morgans, Louisiana & Texas Railroad & Steamship Company, a subsidiary of the Southern Pacific.

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Wide World

The Simplon-Orient Express, Paris to Constantinople, Snowbound Near Constantinople